Series 1958, No. 7

Issued October 1961

SOIL SURVEY

Montgomery County Maryland

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MARYLAND AGRICULTURAL EXPERIMENT STATION

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Montgomery County will help farmers in planning the kind of management that will protect their soils and provide good yields; it will assist engineers in selecting sites for roads, buildings, ponds, drainage and irrigation structures, and other structures; it will assist those interested in establishing or improving woodland; and it will add to the soil scientists' fund of knowledge.

In making this survey, soil scientists examined the soils and recorded all characteristics that would affect the suitability of the soils for farming, forestry, engineering, residential development, or other uses. The scientists plotted the boundaries of the different soils on aerial photographs. Then cartographers prepared from the photographs the detailed soil map that is at the back of this report. Fields, woods, roads, and other landmarks can be seen on the map.

Locating the soils

On the soil map, the boundaries of each soil are outlined and each kind of soil is identified by a symbol. Use the index to map sheets to find out which sheet of the soil map shows the area you wish to study. The map legend tells which soil each symbol stands for. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has a symbol WhA. The legend shows that this symbol identifies Wehadkee silt loam, 0 to 3 percent slopes. This soil and all the others mapped in the county are described in the section, Descriptions of the Soils.

Finding information

Different parts of the report will be of special interest to different groups of readers.

Farmers and those who work with farmers can get information about the soils from the section, Descriptions of the Soils, and suggestions for agricultural management of the soils from the subsection, Capability Groups of Soils. From the subsection, Estimated Yields, they can find what yields can be expected from each kind of soil under a specified level of management. Those interested in woodland management will find suggestions in the subsection, Forests of the County.

Engineers can refer to the subsection, Engineering Uses of Soils, in which are summarized characteristics that affect the suitability of the soils for highways, sewage disposal systems, and other engineering purposes.

County and community planners will find this report helpful in selecting sites for urban and residential development and sites to be reserved for public recreation. So far as practical, areas not well suited to agriculture should be selected for these purposes. Information in the following subsections will be useful: Capability Groups of Soils; Forests of the County; and Engineering Uses of Soils.

Soil scientists will find in the section, Formation and Classification of Soils, information about the parent material of the soils and the forces that transformed the parent material into soils, and a discussion of the classification of the soils of the county into great soil groups.

Terms that are likely to be unfamiliar to some readers are defined in the Glossary. The Guide to Mapping Units, Capability Units, and Sewage Disposal Groups, which is at the back of the report, shows the reader where in the report to find information about each particular soil.

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Soil Survey of Montgomery County, Maryland

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENT STATION

MONTGOMERY COUNTY is in the central part of Maryland (fig. 1). Its land area of 316,160 acres makes it the fifth largest county in the State. It is bounded on the southwest and west by the Potomac River, on the northwest by Frederick County, on the northeast by Howard County, and on the southeast by Prince Georges County and the District of Columbia.

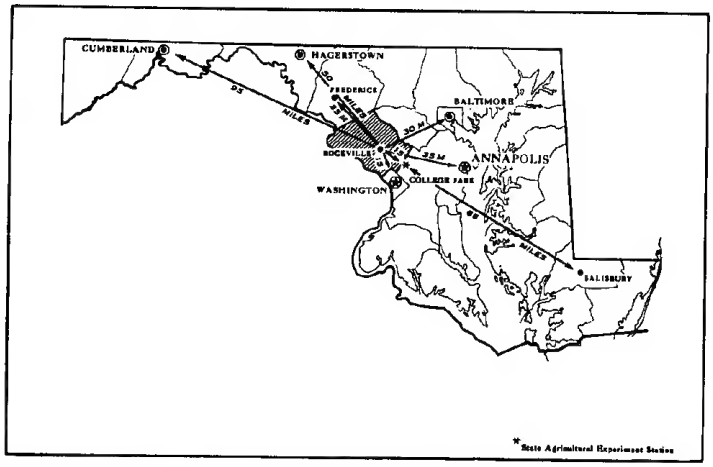

Figure 1.—**Location of Montgomery County in Maryland.**

The county is well suited to highly developed, intensive agriculture. More than 62 percent of the acreage—about 200,000 acres—is suitable for continuous cultivation. About 19 percent—59,000 acres—is suitable for limited cultivation. About 16 percent—50,000 acres—is not well suited to crops but is good for pasture. Only 3 percent of the acreage is so steep, so rough, or so eroded that it is not suitable for any agricultural use except forestry.

In the past few years there has been extensive urban, suburban, and rural-residential development in the southern part of the county. Consequently, although the agricultural uses of the soils are emphasized in this report, attention is also given to the use of the soil survey data in community and county planning.

This survey was made as part of the technical assistance furnished by the Soil Conservation Service to the Montgomery County Soil Conservation District. The fieldwork was finished in 1957. Unless otherwise specified, all statements in the report refer to conditions in the county at the time the survey was in progress.

Soils and Their Relation to Topography

The soils of Montgomery County can be considered in three broad groups according to their position on the landscape: Soils of the uplands, soils of the old stream terraces, and soils of the bottom lands and flood plains. Within these broad topographic groups, the soils vary according to the parent material from which they developed and according to their drainage.

Table 1 shows these relationships among the soils of Montgomery County.

Soils of the uplands.—About 92 percent of the area of the county consists of upland soils. They include (1) soils of the Piedmont Plateau that developed from material weathered from igneous and metamorphic rocks and from old sedimentary rocks, mainly shale and sandstone, and (2) soils of the Coastal Plain that developed from unconsolidated material.

Soils of the old stream terraces.—These soils are mostly on old, high terraces along the Potomac River. The terraces were once flood plains, but they are well above the present stream channels, and some are at a considerable distance from present streams. Alluvium was deposited on these flood plains when the streambeds were at a higher level than at present. Most of this old alluvium washed from soils underlain by limestone or crystalline rocks.

Soils of the bottom lands and flood plains.—The alluvial deposits on bottom lands and flood plains are fairly recent. Most of these areas are still flooded at times. In many places the soils do not show any horizon development, but in some places a weak subsoil has developed. The kind of soil that is present depends chiefly on the kinds of rocks and soils from which the material was washed.

TABLE 1.—*Relationships of the soils according to*

Position and parent material	Excessively drained	Somewhat excessively drained
Uplands—		
Igneous and metamorphic rocks:		
Soft mica schist		Manor
Hard phyllitic mica schist		Manor
Hard phyllitic sericitic schist		Linganore
Mixed mica schist and diabase		
Diabase and other dark basic rocks		
Serpentine and serpentine schist		
Coarse-grained gneiss	Brandywine	
Quartzite, quartz schist, and quartzite conglomerate		
Consolidated sedimentary rocks:		
Red shale and some sandstone		Penn
Red sandstone		Lewisberry
Unconsolidated sediments:		
Outwash sand and gravel		Croom
Outwash sand and gravel with silty mantle		
Sand, clayey sand, and sandy clay		Rumford
Sand reworked by wind	Lakeland	Lakeland
Old stream terraces—		
Mainly limestone alluvium		
Mainly alluvium from mica schist, gneiss, and other rocks		
Bottom lands and flood plains—		
Mainly limestone material		
Mainly red shale and sandstone material		
Mainly igneous and metamorphic material		

[1] The surface layer of these soils is more or less strongly influenced by accumulations of local fine-grained colluvium.

General Soil Map

In a county or other large expanse, it is fairly easy to see differences in the landscape from place to place. Some of the more obvious differences are in the shape, steepness, and length of slopes; in the width, volume, and speed of streams and the shape and size of their valleys; and in the kind of wild vegetation and its condition. A less obvious difference is in the kinds of soils that have developed and the patterns in which they occur on the landscape.

By drawing lines around the different patterns of soils on a small map, we get a general map of the soils. Such a map is useful to those who want a general idea of the soils, who want to compare different parts of a county, or who want to locate large areas suitable for some particular kind of farming or other general use. It does not show accurately the kinds of soils on a single farm or small tract.

In Montgomery County, there are seven general soil patterns, called soil associations. These are shown on the colored general soil map at the back of this report. Each association is named for the dominant soil series. The seven associations are grouped in two divisions, according to the depth of the soils.

Moderately Deep to Deep Soils

This division covers the southeastern two-thirds of the county and a few small areas in the extreme western part. It includes three soil associations.

1. Glenelg-Manor-Chester association

This association consists of well-drained, silty, micaceous soils that are mainly strongly sloping. The Glenelg, Manor, and Chester soils are dominant, but small areas of other soils are included. The Glenelg and Manor soils, which are the most extensive soils in the county, are moderately deep; the Chester soils, which are also extensive, are the deepest soils in the county.

This association is the best agricultural area of the county. The soils are fairly easy to manage and are productive if well managed. All crops common to the area are suitable, but dairying and livestock farming are the dominant agricultural enterprises.

The southern part of this association adjoins the District of Columbia and includes highly developed urban and suburban areas. The soils are well suited to suburban development.

2. Chillum-Beltsville-Croom association

This association consists of silty and gravelly soils that commonly have a dense or, in some places, a cemented layer in the subsoil or substratum. The parent material is sandy to gravelly outwash and is covered by a silty mantle, probably deposited by wind. Most of this association is in the extreme eastern part of the county, on the fringe of the Coastal Plain. There are small areas in the western part of the county within the big bend of the Potomac River; in the vicinity of Martinsburg, Jerusalem, and Elmer; and south of Edwards Ferry Road, near its intersection with River Road.

topographic position, parent material, and drainage.

Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
Manor, Glenelg, Chester, Elioak	Glenville [1]	Glenville [1]	Worsham [1]	Worsham.[1]
Glenelg	Glenville [1]	Glenville [1]	Worsham [1]	Worsham.[1]
Linganore	Urbana		Worsham [1]	Worsham.[1]
Neshaminy			Watchung [1]	Watchung.[1]
Legore, Montalto	Iredell	Iredell	Watchung [1]	Watchung.[1]
Chrome	Conowingo, Aldino	Conowingo	Calvert [1]	Calvert.[1]
	Glenville [1]	Glenville [1]	Worsham [1]	Worsham.[1]
Edgemont	Glenville [1]	Glenville [1]	Worsham [1]	Worsham.[1]
Penn, Bucks	Readington		Croton [1]	
Lewisberry				
Chillum	Beltsville	Leonardtown	Leonardtown	
Sassafras				
Elk, Ashton	Captina			
Wickham			Roanoke	
Huntington	Lindside	Lindside	Melvin	Melvin.
Bermudian	Rowland	Rowland	Bowmansville	Bowmansville.
Congaree	Chewacla	Chewacla	Wehadkee	Wehadkee.

The Chillum, Beltsville, and Croom soils are dominant, but there are small inclusions of Leonardtown, Rumford, Sassafras, Lakeland, and, in the western part of the county, Penn soils.

These soils are strongly acid and low in fertility. Most of the acreage is gently sloping. Nevertheless, because of impeded drainage, runoff is high, and it has caused considerable erosion. To be productive, these soils need to be adequately fertilized and carefully managed to control erosion.

The area in the eastern part of the county is between Washington, D. C., and Baltimore, where suburban development is rapidly expanding. Much of this area, especially the Croom and Chillum soils, is underlain by waterworn, cherty gravel, which is excavated for use in highway and other construction. More than 200 acres was in gravel pits at the time of the survey. There is some general farming, dairying, truck farming, and small-fruit farming. The smaller areas of this association in the western part of the county are used more intensively, especially for dairying and general farming. Considerable acreage is in forest, most of which is second growth. The Chillum and Croom soils are not important to agriculture but are especially well suited to residential and industrial development. The Beltsville soils are also well suited to development, but they present some problems of water disposal because they have a nearly impermeable subsoil.

3. Huntington-Lindside-Melvin association

This association extends from Great Falls to a point just above Mason Island. It includes islands in the Potomac River, flood plains bordering the river, and small areas on terraces. The Huntington soils are well drained; the Lindside soils, moderately well drained; and the Melvin soils, poorly drained. The Huntington soils are the most important and extensive in the association. Included are small areas of Ashton, Elk, and Captina soils. The Ashton and Elk soils are well drained and productive; the Captina soils are moderately well drained and less productive.

The soils in this association are fertile and under good management are quite productive. All, however, are limited to some extent by flooding.

The Huntington, Ashton, Elk, and Captina soils are flooded only occasionally and are used mostly for corn and hay or high-quality pasture. The Lindside soils can be used infrequently for corn or hay but commonly are used for grazing. The Melvin soils are too wet and too frequently flooded for crops. Unless drained and protected from flooding, they can be grazed only in dry periods. Because of the danger of floods, the acreage in this association is not suitable for suburban development. It is especially good for wildlife habitats and recreational purposes.

Shallow to Moderately Deep Soils

This division covers about one-third of the county. It is confined mostly to the northwestern part, but some areas are just south of Hunting Hill and near the Potomac River. There are four soil associations in this division.

4. Manor-Edgemont-Brandywine association

This association occurs only in one narrow strip along the Frederick County line. It consists of strongly sloping, gravelly soils derived from rocks that were partly or mostly quartzite. These soils are well drained or, in the shallower areas, excessively drained. They are low in moisture-supplying capacity and tend to be droughty in periods of low or poorly distributed rainfall.

The Manor soils are channery and gravelly. The Edgemont soils developed almost entirely from quartzite. The Brandywine soils developed mostly from gneiss that contained some quartzite. They are the shallowest and most droughty soils in the association.

The soils in this association are not very productive, but they will produce fairly good yields if fertilized and protected from further erosion. They would be greatly benefited by irrigation. Some of the acreage is so steep or so badly eroded that it is not suitable for cultivation. Most of the acreage, however, is excellent for residential sites, and there is already considerable development.

5. Manor-Linganore-Glenelg association

This association consists of rather shallow soils on fairly strong slopes. These soils contain large amounts of flat fragments of schist. They are mostly well drained and, in spots, excessively drained. This association covers about one-fifth of the area of the county. It is in the northwestern part, adjoining both Frederick and Howard Counties.

Both the Manor and Linganore soils are shallow and somewhat droughty. The Linganore soils commonly are shallower than the Manor soils, and they contain harder, more slaty fragments. The Glenelg soils are somewhat deeper than the Manor soils and have a better developed subsoil. The Glenelg soils are the best agricultural soils in the association. Of the other soils included in this association, the Urbana soils are the most important. They are similar to the Linganore soils but are somewhat deeper and have a tough, dense subsoil that impedes drainage.

General farming is the dominant type of agriculture. There is much emphasis on beef cattle, dairy cattle, and poultry, including turkeys. Many areas are too steep or too eroded, or both, to be used for row crops but are well suited to hay and other forage crops and to pasture. On these areas, grazing should be controlled to prevent further damage to the soil.

This association is not close to the rapidly expanding suburban developments in the county, but there are many estate-type farms and homes in the area and many small towns and villages. The soils are well suited to suburban development.

6. Penn-Lewisberry association

This association consists of shallow to moderately deep soils that are mostly gently sloping and, to some degree, either sandy or shaly. It covers a large area in the extreme western part of the county and occurs in the only part of the county where the soils developed from sedimentary rock.

The Penn and Lewisberry soils are well drained to somewhat excessively drained and at times tend to be droughty. The Penn soils are medium textured and in most places contain many chips of shale. The Lewisberry soils are shallow and sandy and in places contain some red sandstone pebbles. Included in this association are the less well drained Readington soils, which have a heavy, slowly permeable subsoil, and the Croton soils, which occupy poorly drained depressions and swales.

Under good management, the soils in this association are productive. They need to be fertilized and protected from further erosion. The Penn, Lewisberry, and Readington soils would be benefited by irrigation.

Dairying and general farming are the common enterprises. Corn, small grain, forage crops, and pasture crops are grown. Hay and small grain are especially well suited.

In this part of the county, there are fewer country estates and more family-operated farms. Except for a small development in the vicinity of Rushville, there is little suburban expansion.

7. Conowingo-Aldino-Iredell association

This association consists of moderately well drained soils that are shallow to moderately deep. These soils have a tough, very slowly permeable subsoil of either clay or compacted silty clay. Included in this association are small areas of Chrome, Calvert, Watchung, Legore, and Montalto soils.

This association occurs in three locations: One is in the White Grounds south of Boyds and Blocktown; another extends from Hunting Hill to just south of Glen Road; and another extends from the vicinity of the Potomac River northeastward along Falls Road almost to Rockville.

The soils in this association are difficult to manage. Because of the very slow internal movement of water, they are wet much of the year, but they tend to dry out and bake in long, dry periods. In eroded areas the heavy, tough subsoil makes plowing and cultivating difficult. The almost impervious subsoil makes sewage disposal by septic tank difficult to almost impossible. It also makes highway building and other engineering projects difficult.

Most of the soils in this association developed from serpentine and are rather low in fertility. Some areas are known as pine barrens because other species of trees will not grow. The best agricultural use for these soils is pasture. Even for this use they need to be fertilized, protected from erosion, and drained of surface water.

Descriptions of the Soils

In this section the soils and land types in Montgomery County are described in detail. For each series of soils, one typical profile is described. Differences among soils in the same series are noted in the descriptions of the mapping units. Most commonly, the differences are in slope and in the degree of erosion.

The location and distribution of the individual soils are shown on the soil map in the back of this report. The approximate acreage and proportionate extent of the soils are shown in table 2. Many terms used in describing the soils are defined in the Glossary. A more detailed account of the origin of the soils is in the section, Formation and Classification of Soils.

TABLE 2.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Aldino silt loam, 0 to 3 percent slopes	125	(1)
Aldino silt loam, 3 to 8 percent slopes, moderately eroded	1,212	0.4
Aldino silt loam, 8 to 15 percent slopes, moderately eroded	31	(1)
Aldino silt loam, 8 to 15 percent slopes, severely eroded	32	(1)
Ashton silt loam, 0 to 3 percent slopes	92	(1)
Ashton silt loam, 3 to 8 percent slopes, moderately eroded	73	(1)
Beltsville silt loam, 0 to 3 percent slopes, moderately eroded	463	.1
Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	1,211	.4
Beltsville silt loam, 8 to 15 percent slopes, moderately eroded	109	(1)
Bermudian silt loam, 0 to 3 percent slopes	28	(1)
Bermudian silt loam, 3 to 8 percent slopes	42	(1)
Bowmansville silt loam, 0 to 3 percent slopes	2,343	.7
Brandywine loam, 3 to 15 percent slopes, moderately eroded	298	.1
Brandywine loam, 3 to 15 percent slopes, severely eroded	187	.1
Brandywine loam, 15 to 25 percent slopes, moderately eroded	143	(1)
Brandywine loam, 15 to 25 percent slopes, severely eroded	173	.1
Bucks silt loam, 0 to 3 percent slopes	63	(1)
Bucks silt loam, 0 to 3 percent slopes, moderately eroded	136	(1)
Bucks silt loam, 3 to 8 percent slopes, moderately eroded	1,662	.5
Bucks silt loam, 3 to 8 percent slopes, severely eroded	111	(1)
Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded	88	(1)
Calvert silt loam, 0 to 8 percent slopes	460	.1
Captina silt loam, 0 to 3 percent slopes	609	.2
Captina silt loam, 3 to 8 percent slopes, moderately eroded	181	.1
Chester silt loam, 0 to 3 percent slopes	742	.2
Chester silt loam, 0 to 3 percent slopes, moderately eroded	193	.1
Chester silt loam, 3 to 8 percent slopes, moderately eroded	10,063	3.2
Chester silt loam, 3 to 8 percent slopes, severely eroded	836	.3
Chester silt loam, 8 to 15 percent slopes, moderately eroded	446	.1
Chester silt loam, 8 to 15 percent slopes, severely eroded	339	.1
Chewacla silt loam, 0 to 3 percent slopes	3,095	1.0
Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded	232	.1
Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded	101	(1)
Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded	256	.1
Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded	140	(1)
Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded	174	.1
Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded	85	(1)
Chillum silt loam, 3 to 8 percent slopes, moderately eroded	1,404	.4
Chillum silt loam, 8 to 15 percent slopes, moderately eroded	453	.1
Chillum silt loam, 15 to 25 percent slopes, moderately eroded	111	(1)
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded	994	.3
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded	248	0.1
Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded	161	.1
Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded	299	.1
Chrome silt loam, 8 to 15 percent slopes, moderately eroded	140	(1)
Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded	144	(1)
Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded	2,229	.7
Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded	71	(1)
Colluvial land	219	.1
Congaree silt loam, 0 to 3 percent slopes	117	(1)
Conowingo silt loam, 0 to 3 percent slopes, moderately eroded	82	(1)
Conowingo silt loam, 0 to 3 percent slopes, severely eroded	359	.1
Croom gravelly loam, 3 to 8 percent slopes, moderately eroded	697	.2
Croom gravelly loam, 8 to 15 percent slopes, moderately eroded	413	.1
Croom gravelly loam, 8 to 15 percent slopes, severely eroded	129	(1)
Croom gravelly loam, 15 to 25 percent slopes, moderately eroded	126	(1)
Croom gravelly loam, 15 to 25 percent slopes, severely eroded	101	(1)
Croom gravelly loam, 25 to 45 percent slopes, moderately eroded	148	(1)
Croom gravelly loam, 25 to 45 percent slopes, severely eroded	116	(1)
Croton silt loam, 0 to 8 percent slopes	2,009	.6
Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded	42	(1)
Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded	63	(1)
Elioak silt loam, 0 to 3 percent slopes	24	(1)
Elioak silt loam, 3 to 8 percent slopes, moderately eroded	1,562	.5
Elioak silt loam, 8 to 15 percent slopes, moderately eroded	159	.1
Elioak silty clay loam, 3 to 8 percent slopes, severely eroded	246	.1
Elioak silty clay loam, 8 to 15 percent slopes, severely eroded	93	(1)
Elk silt loam, 0 to 3 percent slopes, moderately eroded	38	(1)
Elk silt loam, 3 to 8 percent slopes, moderately eroded	318	.1
Elk silty clay loam, 8 to 15 percent slopes, severely eroded	34	(1)
Eroded land, Penn materials	290	.1
Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded	4,905	1.6
Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded	1,412	.4
Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded	784	.2
Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded	847	.3
Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded	107	(1)
Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded	165	.1
Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded	101	(1)
Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded	78	(1)

See footnote at end of table.

TABLE 2.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Area	Extent
	Acres	*Percent*
Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded	80	(1)
Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded	62	(1)
Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded	59	(1)
Glenelg silt loam, 0 to 3 percent slopes	410	0. 1
Glenelg silt loam, 3 to 8 percent slopes, moderately eroded	37, 629	11. 9
Glenelg silt loam, 3 to 8 percent slopes, severely eroded	8, 438	2. 7
Glenelg silt loam, 8 to 15 percent slopes, moderately eroded	5, 169	1. 6
Glenelg silt loam, 8 to 15 percent slopes, severely eroded	4, 264	1. 3
Glenelg silt loam, 15 to 25 percent slopes, moderately eroded	944	. 3
Glenelg silt loam, 15 to 25 percent slopes, severely eroded	672	. 2
Glenelg soils, 25 to 45 percent slopes, moderately eroded	167	. 1
Glenelg soils, 25 to 45 percent slopes, severely eroded	49	(1)
Glenville silt loam, 0 to 3 percent slopes	2, 141	. 7
Glenville silt loam, 3 to 8 percent slopes	4, 772	1. 5
Glenville silt loam, 3 to 8 percent slopes, moderately eroded	685	. 2
Gravel pit	221	. 1
Gullied land, Penn materials	608	. 2
Huntington silt loam, 0 to 3 percent slopes	1, 927	. 6
Huntington silt loam, 3 to 8 percent slopes, moderately eroded	248	. 1
Iredell silt loam, 0 to 3 percent slopes	46	(1)
Iredell silt loam, 3 to 8 percent slopes, moderately eroded	788	. 2
Iredell silty clay loam, 3 to 15 percent slopes, severely eroded	50	(1)
Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded	68	(1)
Lakeland loamy sand, 15 to 25 percent slopes, severely eroded	19	(1)
Legore silt loam, 3 to 8 percent slopes, moderately eroded	411	. 1
Legore silt loam, 3 to 8 percent slopes, severely eroded	324	. 1
Legore silt loam, 8 to 15 percent slopes, moderately eroded	269	. 1
Legore silt loam, 8 to 15 percent slopes, severely eroded	446	. 1
Legore silt loam, 15 to 25 percent slopes, severely eroded	73	(1)
Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded	79	(1)
Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded	72	(1)
Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded	411	. 1
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded	2, 996	. 9
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded	1, 241	. 4
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded	426	. 1
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded	858	. 3
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded	53	(1)
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded	361	. 1
Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded	150	(1)
Lindside silt loam, 0 to 3 percent slopes	2, 180	0. 7
Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded	2, 048	. 6
Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded	2, 466	. 8
Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded	1, 482	. 5
Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded	706	. 2
Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded	1, 811	. 6
Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded	1, 550	. 5
Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded	294	. 1
Made land	753	. 2
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded	6, 284	2. 0
Manor channery silt loam, 3 to 8 percent slopes, severely eroded	6, 919	2. 2
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded	5, 667	1. 8
Manor channery silt loam, 8 to 15 percent slopes, severely eroded	10, 300	3. 3
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded	3, 309	1. 4
Manor channery silt loam, 15 to 25 percent slopes, severely eroded	5, 384	1. 7
Manor channery silt loam, 25 to 45 percent slopes, moderately eroded	1, 227	. 4
Manor channery silt loam, 25 to 45 percent slopes, severely eroded	857	. 3
Manor silt loam, 3 to 8 percent slopes, moderately eroded	11, 086	3. 5
Manor silt loam, 3 to 8 percent slopes, severely eroded	11, 191	3. 5
Manor silt loam, 8 to 15 percent slopes, moderately eroded	16, 011	5. 1
Manor silt loam, 8 to 15 percent slopes, severely eroded	18, 551	5. 9
Manor silt loam, 15 to 25 percent slopes, moderately eroded	8, 257	2. 6
Manor silt loam, 15 to 25 percent slopes, severely eroded	8, 491	2. 7
Manor silt loam, 25 to 45 percent slopes, moderately eroded	3, 047	1. 0
Manor soils, 8 to 15 percent slopes, very severely eroded	529	. 2
Manor soils, 15 to 25 percent slopes, very severely eroded	352	. 1
Manor soils, 25 to 45 percent slopes, severely eroded	655	. 2
Manor soils, 45 to 65 percent slopes	611	. 2
Melvin silt loam, 0 to 3 percent slopes	1, 226	. 4
Mixed alluvial land	149	(1)
Montalto silt loam, 3 to 8 percent slopes, moderately eroded	150	(1)
Montalto silt loam, 8 to 15 percent slopes, moderately eroded	75	(1)
Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded	36	(1)
Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded	465	. 1
Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded	176	. 1
Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded	1, 914	. 6
Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded	221	. 1
Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded	51	(1)

See footnote at end of table.

TABLE 2.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Area	Extent
	Acres	*Percent*
Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded	136	(1)
Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded	40	(1)
Penn silt loam, 0 to 3 percent slopes, moderately eroded	496	0. 2
Penn silt loam, 3 to 8 percent slopes, moderately eroded	5, 748	1. 8
Penn silt loam, 3 to 8 percent slopes, severely eroded	6, 982	2. 2
Penn silt loam, 8 to 15 percent slopes, moderately eroded	1, 131	. 4
Penn silt loam, 8 to 15 percent slopes, severely eroded	3, 002	. 9
Penn silt loam, 8 to 15 percent slopes, very severely eroded	385	. 1
Penn silt loam, 15 to 25 percent slopes, moderately eroded	646	. 2
Penn silt loam, 15 to 25 percent slopes, severely eroded	679	. 2
Penn silt loam, 25 to 45 percent slopes, moderately eroded	406	. 1
Penn soils, 45 to 65 percent slopes	419	. 1
Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded	55	(1)
Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded	129	(1)
Readington silt loam, 0 to 3 percent slopes	1, 641	. 5
Readington silt loam, 0 to 3 percent slopes, moderately eroded	541	. 2
Readington silt loam, 3 to 8 percent slopes, moderately eroded	2, 943	. 9
Roanoke silt loam, 0 to 8 percent slopes	260	. 1
Rock land	967	. 3
Rowland silt loam, 0 to 8 percent slopes	692	0. 2
Rumford loamy sand, 3 to 8 percent slopes, moderately eroded	43	(1)
Sassafras loam, 3 to 8 percent slopes, moderately eroded	88	(1)
Sassafras loam, 8 to 15 percent slopes, moderately eroded	28	(1)
Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded	32	(1)
Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded	155	(1)
Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded	105	(1)
Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded	26	(1)
Stony land, Manor materials, 3 to 15 percent slopes	209	. 1
Stony land, Manor materials, 15 to 45 percent slopes	679	. 2
Urbana silt loam, 0 to 3 percent slopes	53	(1)
Urbana silt loam, 3 to 8 percent slopes, moderately eroded	1, 480	. 5
Urbana silt loam, 8 to 15 percent slopes, moderately eroded	145	(1)
Urbana silt loam, 8 to 15 percent slopes, severely eroded	66	(1)
Watchung silt loam, 0 to 8 percent slopes	690	. 2
Wehadkee silt loam, 0 to 3 percent slopes	10, 984	3. 5
Wickham silt loam, 0 to 3 percent slopes	160	. 1
Wickham silt loam, 3 to 8 percent slopes, moderately eroded	312	. 1
Wickham silt loam, 8 to 15 percent slopes, moderately eroded	56	(1)
Worsham silt loam, 0 to 8 percent slopes	10, 772	3. 4

[1] Less than 0.1 percent.

Aldino series

The Aldino series consists of somewhat poorly drained to moderately well drained soils that developed on the uplands of the Piedmont Plateau from materials weathered from serpentine. These soils have a distinct siltpan or fragipan in the subsoil. The pan restricts the movement of water and makes these soils wet for considerable periods after rains or thaws. These soils are generally adjacent to the Conowingo, Iredell, Chrome, and Calvert soils, which developed from the same or a similar kind of material.

Profile of Aldino silt loam, 0 to 3 percent slopes, in a forested area near Hunting Hill:

Surface soil—

A_1 0 to 1 inch, very dark gray (10YR 3/1) silt loam; moderate, fine, granular structure; friable when moist; fine roots plentiful; strongly acid; abrupt, smooth boundary.

A_2 1 to 5 inches, grayish-brown (2.5Y 5/2) silt loam; weak, fine, subangular blocky structure; friable when moist; many fine tree roots; strongly acid; gradual, smooth boundary.

Subsoil—

B_1 5 to 11 inches, grayish-brown (2.5Y 5/2) silt loam; moderate, thick, platy structure; hard when dry, firm when moist; 2 to 5 percent fine concretions, probably of iron and manganese; medium acid; abrupt, smooth boundary.

B_{2m} 11 to 28 inches, grayish-brown (10YR 5/2) silty clay; many, fine, distinct mottles of brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4); moderate, very thick, platy structure; very hard when dry, very firm when moist, and sticky when wet; continuous clayskins that have some black, manganic coatings; medium acid; abrupt, smooth boundary.

Substratum—

C 28 inches +, decomposed serpentine, rather loose and somewhat clayey in places; slightly acid.

In places the fragipan (B_{2m} horizon) has a finer and stronger structure than that described. In some places the depth to the fragipan is greater; in others, particularly in eroded or regraded areas, the pan is at the surface; in still other the pan has disappeared entirely and the serpentine bedrock is exposed.

The Aldino soils in Montgomery County are not extensive, but they are important where they occur. Some areas are used for general crops and pasture. Considerable acreage in the southern part of the county has been used for suburban development, but impeded drainage creates many problems. These soils are not particularly well suited either to agriculture or to residential development. They tend to be seasonally wet to very wet and, on the other hand, to be droughty in dry weather.

Aldino silt loam, 0 to 3 percent slopes (AdA).—The profile of this soil is like that described as representative

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of the series. This soil has a thicker surface soil than the other Aldino soils in the county but is less well drained. Permeability and runoff are slow. Surface drainage is a serious problem, but erosion generally is not. If drained, this soil is suitable for many kinds of crops. Because of poor natural drainage, it is in capability unit IIw–11.

Aldino silt loam, 3 to 8 percent slopes, moderately eroded (AdB2).—Because this soil is more strongly sloping than Aldino silt loam, 0 to 3 percent slopes, it has somewhat better surface drainage but a more serious erosion hazard. If drained and protected from erosion, this soil is suitable for many kinds of crops. It is in capability unit IIIe–13.

Aldino silt loam, 8 to 15 percent slopes, moderately eroded (AdC2).—This soil can be cultivated safely if there is adequate drainage and erosion control. It is in capability unit IIIe–13.

Aldino silt loam, 8 to 15 percent slopes, severely eroded (AdC3).—This soil has lost most or all of the original surface soil, and in places the fragipan is at the surface. Cultivation is advisable only under the very best management. Clean-cultivated crops should be grown only infrequently and in long rotations. This soil is in capability unit IVe–41. Included are a few small gullied areas that should be kept in permanent vegetation and about 4 acres that have slopes of slightly more than 15 percent.

Ashton series

The Ashton series consists of deep, well-drained, weakly developed soils that are on low terraces along the Potomac River. These soils developed from old alluvium that washed from soils underlain by limestone. This alluvium was deposited on former flood plains. It originated as far away as Frederick and Washington Counties in Maryland and Berkeley County in West Virginia.

These soils are above the present flood plains. They generally are at higher elevations than the Huntington soils, which are on first bottoms, and at lower elevations than the Elk and Captina soils, which are on older and higher terraces.

Profile of Ashton silt loam, 0 to 3 percent slopes, in a cultivated area one-eighth of a mile south of Whites Ferry:

Surface soil—

A_p 0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable when moist; a few rounded gravel fragments; slightly acid; clear, smooth boundary; horizon is 7 to 8 inches thick.

A_2 7 to 14 inches, dark-brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable when moist; a few rounded gravel fragments; slightly acid; clear, smooth boundary; horizon is 5 to 7 inches thick.

Subsoil—

B_1 14 to 20 inches, dark-brown (7.5YR 4/4) silt loam; weak, coarse, subangular blocky structure; friable when moist; a few rounded gravel fragments; slightly acid; clear, smooth boundary; horizon is 6 to 8 inches thick.

B_2 20 to 40 inches, reddish-brown (5YR 4/4), light silty clay loam; moderate, medium, subangular blocky structure; crushes under moderate pressure into fine, weak plates; friable when moist; a few black coatings, probably of manganese, on structural surfaces; some rounded gravel fragments; strongly to very strongly acid; clear, smooth boundary; horizon is 20 to 24 inches thick.

B_3 40 to 60 inches +, dark-brown (7.5YR 4/4), very gravelly, light silty clay loam; moderate, medium, blocky and subangular blocky structure; many prominent, black, manganic coatings on surfaces; more than 50 percent rounded gravel; strongly to very strongly acid; this horizon is transitional between the true subsoil and the substratum of gravel, cobblestones, and stones that is generally at depths of 5 feet or more.

The gravel in the Ashton soils is mostly chert, but in some places it contains sandstone or other material. In many places the subsoil is less red than that described, and in a few places it is mottled at a depth of 36 inches or more.

The Ashton soils are not very extensive in the county, but they are fertile and are used intensively for crops. Under good management yields are high. Although nearly level, the Ashton soils are well drained and are seldom wet for long periods. The moisture-supplying capacity is high. These soils are above the normal high-water level but are under water during major floods, which are infrequent.

Ashton silt loam, 0 to 3 percent slopes (AsA).—The profile of this soil is like the profile described as representative of the series. Because this soil is nearly level and not eroded, it can be safely cultivated under ordinary good farming practices. It is in capability unit I–6.

Ashton silt loam, 3 to 8 percent slopes, moderately eroded (AsB2).—This soil needs more careful management than Ashton silt loam, 0 to 3 percent slopes, because it is eroded and sloping. Rotations should be at least 3 years long. In some places, diversion terraces will prevent damage by water that runs from higher elevations. This soil is in capability unit IIe–6.

Beltsville series

The Beltsville series consists of moderately deep, moderately well drained soils. These soils developed from silty materials that were deposited over strongly weathered sandy materials and, in places, over waterlaid gravelly materials. In the subsoil there is a dense, very compact layer that is locally known as a hardpan and technically called a fragipan. This pan developed in the silty mantle and generally is above the sandy or gravelly substrata. Although not cemented, it is almost impermeable to plant roots and water. The substrata are part of an old alluvial outwash fan consisting of coarse delta material that probably was carried by the Potomac River and deposited on the Coastal Plain. Later, a mantle of silt was deposited over parts of the delta. There is some evidence that the silty mantle was loessal. The Beltsville soils developed where the silt is relatively thick and the drainage system is not well developed. They are in the same general areas as the well-drained Chillum soils and the poorly drained Leonardtown soils, which developed on similar materials.

The Beltsville soils are not extensive in this county. They occur in two widely separated areas. One area is in the narrow fringe of the Coastal Plain next to the Prince Georges County line, between Burtonsville and the District of Columbia; the other is in some remaining coastal-plain material in the western part of the county

near Martinsburg. In the western part of the county, these soils are near the Chillum and Penn soils.

Profile of a Beltsville silt loam in a forested area on Beltsville Road one-tenth of a mile west of the Prince Georges County line:

Surface soil—
- A_{00} 1 to ½ inch, scattered pine needles.
- A_0 ½ to 0 inch, loose but felty decomposed leaf mold.
- A_1 0 to 2 inches, very dark gray (10YR 3/1) silt loam; moderate, fine, crumb structure; loose; roots abundant; strongly acid; abrupt, wavy boundary.
- A_2 2 to 13 inches, yellow (2.5Y 8/6) silt loam; weak, fine, subangular blocky structure; friable when moist and slightly sticky when wet; roots abundant; strongly acid; gradual, smooth boundary.

Subsoil—
- B_1 13 to 21 inches, brownish-yellow (10YR 6/6), light silty clay loam; few, medium, faint mottles of strong brown (7.5YR 5/8); moderate, medium and coarse, subangular blocky structure; firm when moist; roots fairly abundant; a few rounded pebbles; thin, distinct clayskins on some faces; strongly acid; gradual to clear, wavy boundary.
- B_{21} 21 to 31 inches, brownish-yellow (10YR 6/8) silty clay loam; few, fine, distinct mottles of red (2.5YR 5/6); weak, coarse, platy structure; firm when moist; roots few, between structural elements only; a few pebbles and a few faint clayskins; strongly acid; clear, irregular boundary.
- B_{22m} 31 to 42 inches, reddish-yellow (7.5YR 6/6) clay loam; many, fine, faint mottles of reddish yellow (5YR 6/8) and many vertical channels and horizontal streaks of gray silt and clay; compound structure—moderate, very coarse, platy and moderate, medium to coarse, subangular blocky; very compact and dense; very firm when moist; very few roots; some pebbles and a few clayskins; this is the fragipan, or hardpan; strongly acid; clear, smooth boundary.
- B_{3m} 42 to 48 inches, reddish-yellow (7.5YR 6/6) clay loam; many, medium, distinct mottles of light yellowish brown (10YR 6/4), reddish yellow (5YR 6/8), and white (2.5Y 8/2); compound structure—moderate, very thick, platy and moderate, coarse, blocky; compact and dense; very firm when moist; practically no roots; some pebbles and some light-gray to white silt coats; strongly acid; this lower hardpan is a transition between the true subsoil and the substratum.

Substratum—
- CD 48 to 54 inches +, very pale brown (10YR 7/3) silty clay loam; abundant, medium, distinct mottles of reddish yellow (7.5YR 6/6) and light gray (10YR 7/2); massive; very firm; strongly acid; underlain at some depth by gravel.

The native forest vegetation consisted of Virginia pine and an undergrowth of wild azalea.

At the location shown for the representative profile, the silty mantle is partially mixed with the underlying gravelly materials. In many places there is, in the upper part of the substratum, an abrupt transition to the gravelly or sandy materials. In such places the substratum is designated a D horizon instead of a CD horizon. The Beltsville soils grade into the Chillum soils, which have a thin fragipan or none but do have a hard, cemented, gravelly D horizon.

Because of the almost impervious fragipan, the Beltsville soils tend to be wet at times. Frequently, they are saturated near the surface but almost dry within or below the fragipan. The moisture-supplying capacity is moderate. A few slightly depressed areas in the uplands are ponded for short periods after long, heavy rains or quick thaws.

Beltsville silt loam, 0 to 3 percent slopes, moderately eroded (BaA2).—The profile of this soil is like the profile described as representative of the series. Because this soil is nearly level, runoff is relatively slow and, therefore, the hazard of erosion is slight. On the other hand, this soil is very wet at times and for most uses needs surface drainage. If adequately drained, it is suitable for most crops grown in the area. However, only a small part of the acreage is cultivated. Because of impeded drainage, this soil is in capability unit IIw–8. Included are 10 acres that have a sandy loam surface soil.

Beltsville silt loam, 3 to 8 percent slopes, moderately eroded (BaB2).—Although this soil is sloping and moderately eroded, wetness presents a more serious management problem than erosion. For this reason this soil is in capability unit IIw–8. Included are 19 acres that have a sandy loam surface soil.

Beltsville silt loam, 8 to 15 percent slopes, moderately eroded (BaC2).—On this soil, erosion presents a more serious management problem than impeded drainage. In fact, because of the slow percolation of water, runoff is so rapid that erosion may cause serious damage. This soil is in capability unit IIIe–13. Included are 14 acres of severely eroded soils. These spots, which are indicated on the soil map by erosion symbols, should be kept in permanent vegetation.

Bermudian series

The Bermudian series consists of deep, well-drained soils on flood plains. These soils developed from fine materials that washed from soils underlain by red shale and sandstone and were deposited by overflow along rivers and streams. The areas from which these materials washed are now occupied by soils of the Penn, Readington, and Lewisberry series. The Bermudian soils are acid throughout. They are near the moderately well drained Rowland soils and the poorly drained Bowmansville soils.

Profile of Bermudian silt loam, 0 to 3 percent slopes, in a pasture on Willard Road, one-fourth of a mile north of its intersection with River Road:

Surface soil—
1. 0 to 12 inches, dark reddish-brown (2.5YR 3/4) silt loam; very weak, thin, platy structure; friable when moist; medium acid; gradual, smooth boundary; horizon is 12 to 14 inches thick.

Subsoil—
2. 12 to 47 inches, reddish-brown (2.5YR 4/4) silt loam; weak, coarse, subangular blocky structure; friable when moist; few, faint, discontinuous clayskins; medium acid; gradual, smooth boundary; horizon is 30 to 36 inches thick.
3. 47 to 72 inches +, dark reddish-brown (2.5YR 3/4) silt loam; weak, medium, subangular blocky structure; friable when moist; few, faint mottles of yellowish red (5YR 4/6) and few, scattered manganese coatings; contains few thin lenses of sandy material; strongly acid.

The horizons in the representative profile are designated by numbers because there is little difference between horizons. This indicates that the soils have developed little if at all since the materials were deposited. A third horizon of the subsoil, not shown in the profile, normally grades to a somewhat sandy and gravelly substratum. In some places, mottles occur at or below a

depth of 36 inches. Mica flakes also occur in places, particularly in the lower part of the subsoil.

The Bermudian soils are of very small extent in the county but are important where they occur. They are easily worked and are well suited to most crops. They are productive under good management. Their moisture-supplying capacity is high to moderately high. These soils may be flooded occasionally in periods of high water but not every year. Floods are normally of short duration and are not likely to seriously affect late-planted crops.

Bermudian silt loam, 0 to 3 percent slopes (BeA).—The profile of this soil is like that described as representative of the series. Except for the hazard of occasional flooding, there are no serious management problems. This soil is in capability unit I–6.

Bermudian silt loam, 3 to 8 percent slopes (BeB).—This gently sloping soil needs careful management because it is subject to erosion. It is in capability unit IIe–6.

Bowmansville series

The Bowmansville series consists of poorly drained soils on flood plains. These soils developed from fine materials that washed from soils underlain by red shale and sandstone and were deposited by overflow along rivers and streams. The areas from which these materials washed are now occupied by the Penn, Readington, Lewisberry, and similar soils. The Bowmansville soils are acid throughout. They are on bottom lands near the moderately well drained Rowland soils and the well drained Bermudian soils. They are at lower elevations than the Rowland and Bermudian soils and are wetter and more easily flooded.

Profile of Bowmansville silt loam, 0 to 3 percent slopes, in a wooded area about 200 feet south of River Road one-half mile west of its intersection with Willard Road:

Surface soil—

A_1 0 to 18 inches, dark-red (2.5YR 3/6) silt loam; faint mottles of weak red (2.5YR 5/2) and black; weak, fine, subangular blocky structure; friable when moist; many fine roots in upper part but few in lower part; medium acid; gradual, smooth boundary; horizon is 12 to 18 inches thick.

Subsoil—

B_g 18 to 48 inches +, dark-red (2.5YR 3/6) silty clay loam; abundant, coarse mottles of gray (5YR 5/1); moderate, medium, blocky structure; friable when moist; strongly acid; grades at greater depth to a sandy or gravelly substratum.

These soils are nearly uniform, but some areas have a thin overwash of new material that in places is slightly sandy. The overwash is red and has, instead of mottles, some rusty brown specks and streaks.

Only one Bowmansville soil is mapped in the county, but it is fairly extensive. It has a high water table and is poorly drained. It is frequently flooded, sometimes for long periods. The native vegetation was pin oak, maple, and alder.

Bowmansville silt loam, 0 to 3 percent slopes (BoA).—The profile of this soil is like that described as representative of the series. Because of poor drainage and the hazard of severe flooding, most of this soil is used for pasture or is left in trees. There is practically no erosion problem. This soil is in capability unit VIw–1. Included are a few small areas that have slopes of slightly more than 3 percent.

Brandywine series

The Brandywine series consists of very shallow, excessively drained soils that developed from materials weathered from a granitelike rock called gneiss. These soils are on upland ridges on the Piedmont Plateau and are generally associated with the Manor, Glenelg, and Linganore soils.

Profile of Brandywine loam, 3 to 15 percent slopes, moderately eroded, in a forested area near Howard County:

Surface soil—

A_1 0 to 1½ inches, very dark brown (10YR 2/2) loam; weak, fine, granular structure; loose; strongly acid; abrupt, smooth boundary.

A_2 1½ to 5 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, subangular blocky structure; loose to very friable; strongly acid; abrupt, smooth boundary.

Subsoil—

BC 5 to 10 inches, strong-brown (7.5YR 5/6), gritty loam, slightly heavier than the A_1 and A_2 horizons; weak, fine, subangular blocky structure; friable when moist; a large proportion is weathered fragments of gneiss; strongly acid; gradual, irregular boundary; this is a weakly developed subsoil, more like a transition between the surface soil and the substratum.

Substratum—

C 10 to 15 inches, yellowish-red (5YR 5/6), strongly weathered gneiss that has many hard fragments of gneiss and quartzite; medium acid.

D_r 15 inches +, hard, unweathered gneiss.

The native vegetation was chestnut oak, red oak, and hickory. Gneiss and quartzite fragments are common in the surface soil but generally not abundant. In some local areas, there is a very thin B_2 horizon just above the BC horizon. The BC horizon is a very weak and skeletal B horizon. In some places the C horizon is many feet deep over hard bedrock.

The Brandywine soils are fairly extensive in the county. They are not well suited to agriculture, because they are shallow and acid and tend to be droughty in dry weather. Under the best management, however, fairly good crops are grown. Some areas that have been cultivated but poorly managed have been abandoned for crops and are used for grazing. This practice has resulted in further erosion, and some areas now are almost barren.

Brandywine loam, 3 to 15 percent slopes, moderately eroded (BrC2).—The profile of this soil is like that described as representative of the series. Although only part of the surface soil has been removed by erosion, this soil is shallow and is susceptible to further erosion. It is in capability unit IIIs–7.

Brandywine loam, 3 to 15 percent slopes, severely eroded (BrC3).—This soil has lost through erosion all of the original surface soil and part of the thin subsoil. Its use for crops is limited, but some crops can be grown in long rotations if clean-tilled crops are planted infrequently. This soil is in capability unit IVe–10.

Brandywine loam, 15 to 25 percent slopes, moderately eroded (BrD2).—This soil is of limited use for crops because it is shallow and steep. It is in capability unit IVe–10.

Brandywine loam, 15 to 25 percent slopes, severely eroded (BrD3).—Erosion has removed all of the original surface layer from this soil, and most of the subsoil. A few to many gullies have formed. Some have cut deep into the parent material, and others down to the bedrock. This soil is not suited to crops or pasture. It should be planted to trees or allowed to revert to forest. The trees may not be profitable, but they will provide watershed protection or wildlife habitats. This soil is in capability unit VIIe–3.

Bucks series

The Bucks series consists of deep, well-drained soils developed from materials weathered from dark-red shale and sandstone of Triassic age. These soils are in the western part of the county, on the very gently rolling uplands of the Piedmont Plateau. They are near the Penn, Lewisberry, and Readington soils. The Bucks soils are much deeper than the Penn soils, deeper and less sandy than the Lewisberry soils, and better drained than the Readington soils.

Profile of a Bucks silt loam about 50 yards west of Lees Corner at the intersection of State Highways Nos. 117 and 28:

Surface soil—

A_1 0 to 3 inches, dark reddish-gray (5YR 4/2) silt loam; weak, medium, granular structure; loose; roots abundant; medium acid to slightly acid; clear, smooth boundary; horizon is 2 to 3 inches thick.

A_2 3 to 12 inches, reddish-brown (5YR 4/3) silt loam; thin, platy structure; firm when moist; roots abundant; medium acid to strongly acid; clear, wavy boundary; horizon is 7 to 10 inches thick.

Subsoil—

B_1 12 to 17 inches, reddish-brown (5YR 4/4) silt loam; moderate, medium to coarse, subangular blocky structure; hard when dry, firm when moist, and slightly sticky when wet; strongly to very strongly acid; clear, wavy boundary; horizon is 5 to 6 inches thick.

B_2 17 to 23 inches, yellowish-red (5YR 4/6), heavy silt loam; moderate, medium, subangular blocky structure; firm when moist and sticky when wet; almost continuous clayskins of red (2.5YR 4/6); strongly to very strongly acid; clear, irregular boundary; horizon is 6 to 8 inches thick.

B_3 23 to 33 inches, reddish-brown (2.5YR 4/4) loam; moderate, medium, subangular blocky structure; firm when moist; contains a few fragments of red sandstone; strongly to very strongly acid; gradual, irregular boundary; horizon is 8 to 10 inches thick.

Substratum—

C 33 to 40 inches +, reddish-brown (2.5YR 4/4), strongly weathered sandstone of loam texture; firm in place but friable when removed; strongly acid.

Where they grade to the Lewisberry soils, these soils are slightly sandy. In some places the entire profile is a little less red and more brown. In many places the depth to the C horizon is somewhat greater than in the representative profile.

The Bucks soils are fairly extensive in the county. They are well drained, moderately permeable, and fairly high in moisture-supplying capacity. Although not highly fertile, they are productive if fertilized and otherwise well managed. They are suited to most crops grown in the area, including corn, small grain, hay crops, truck crops, and pasture.

Bucks silt loam, 0 to 3 percent slopes (BuA).—The profile of this soil is like that described as representative of the series. Because this soil is nearly level and because it has not been abused, erosion is not a problem. With minimum control of erosion, it can be cultivated safely. This soil is in capability unit I–4.

Bucks silt loam, 0 to 3 percent slopes, moderately eroded (BuA2).—Most of the original surface layer of this soil has been lost through erosion. Better erosion control practices are needed if cultivation continues. This soil is in capability unit IIe–4.

Bucks silt loam, 3 to 8 percent slopes, moderately eroded (BuB2).—This soil is on steeper slopes than Bucks silt loam, 0 to 3 percent slopes, and most of its original surface soil has been removed by erosion. Because of the erosion hazard, this soil is in capability unit IIe–4.

Bucks silt loam, 3 to 8 percent slopes, severely eroded (BuB3).—This soil has lost practically all of the original surface soil and part of the subsoil through erosion. There are scattered to fairly common gullies, some of which extend through the subsoil into the underlying material. Except for the most severely gullied areas, which should be kept in permanent vegetation, this soil can be cultivated. Intensive erosion control practices are needed. This soil is in capability unit IIIe–4.

Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded (BuC3).—Almost half of this soil is severely eroded; the rest is moderately eroded. If cultivated, this soil needs special practices to control erosion. It is in capability unit IIIe–4.

Calvert series

The Calvert series consists of poorly drained soils that developed from materials weathered from serpentine, a hard, basic, igneous rock that is unusually high in magnesium. These soils occupy nearly level to somewhat depressed areas on the Piedmont Plateau. They are near the Conowingo, Chrome, Neshaminy, and Aldino soils, which are also underlain by serpentine.

Profile of Calvert silt loam, 0 to 8 percent slopes, in a forested area on Piney Meeting House Road near Hunting Hill Road:

Surface soil—

A_{00} 2 to ¼ inch, litter of oak leaves and some pine needles.

A_0 ¼ to 0 inch, decomposed organic matter.

A_1 0 to ½ inch, black (10YR 2/1) silt loam; moderate, fine, granular structure; loose; roots plentiful; strongly acid; clear, smooth boundary

A_{2g} ½ to 5 inches, grayish-brown (2.5Y 5/2) silt loam; many, fine, faint mottles of dark yellowish brown (10YR 4/4); weak, thin, platy structure; friable when moist; fine roots plentiful; strongly acid; abrupt, smooth boundary; horizon is 4 to 5 inches thick.

Subsoil—

B_{1g} 5 to 9 inches, light olive-brown (2.5Y 5/4) silt loam; common, fine, distinct mottles of dark yellowish brown (10YR 4/4) and a few, fine, distinct black specks; moderate, medium, platy structure; firm when moist; strongly acid; abrupt, smooth boundary; horizon is 4 to 5 inches thick.

B_{21g} 9 to 13 inches, evenly, finely, and distinctly mottled, dark yellowish-brown (10YR 4/4), dark grayish-brown (10YR 4/2), and grayish-brown (2.5Y 5/2) silty clay; few, fine mottles of black; moderate, fine, blocky structure; firm to friable when moist; a few fine roots between peds; medium acid; abrupt, smooth boundary; horizon is 4 to 5 inches thick.

B_{22g} 13 to 16 inches, evenly, finely, and faintly mottled, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/8) clay; few, fine mottles of black; strong, medium, blocky structure; firm when moist; some fine roots between peds; discontinuous clayskins of grayish brown (2.5Y 5/2) and very dark grayish brown (10YR 3/2); medium acid; abrupt, smooth boundary; horizon is 3 to 4 inches thick.

B_{3g} 16 to 18 inches, strong-brown (7.5YR 5/8) clay, heavy clayskins of very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2); strong, coarse, blocky structure; firm when moist; a few fine roots between peds; common, medium, black specks; medium acid; clear, irregular boundary; horizon is 2 to 3 inches thick.

Substratum—

C 18 to 20 inches, weathered serpentine schist.

D_r 20 inches +, hard, undecomposed serpentine schist.

The native vegetation was black oak and white oak but included a little Virginia pine. Although in most areas the soil is as shallow as that described in the profile, some more depressed areas have a mantle of fine local colluvium from adjacent higher slopes; in these places the soil is as much as 4 feet deep. In places a few stones are scattered on the surface.

The Calvert soils are poorly drained and are wet for some time after rains. In wet periods the water table is high. Some depressed areas are ponded temporarily after heavy rains or quick thaws. In dry seasons the soils are dry because the tight subsoil prevents the upward movement of water. Only one Calvert soil is mapped in the county, and it is not extensive.

Calvert silt loam, 0 to 8 percent slopes (CaB).—Most of this soil is on slopes of less than 3 percent. This soil is difficult to drain and, because it is not very productive, hardly worth draining. Wooded areas should be allowed to remain in trees, and cleared areas should be kept in pasture or other permanent vegetation. This soil is in capability unit Vw–2.

Captina series

The Captina series consists of moderately well drained soils that have distinct siltpans, or fragipans. These soils developed from old alluvium that washed from soils underlain by limestone. They occur on undulating to sloping, high river terraces, near the better drained Elk soils, and on somewhat lower terraces, or second bottoms, near the well-drained Ashton soils.

Profile of Captina silt loam, 0 to 3 percent slopes, in a pastured area one-half mile northwest of the intersection of River Road and Elmer School Road:

Surface soil—

A_{p1} 0 to 1 inch, very dark grayish-brown (10YR 3/2) silt loam; strong, fine, crumb structure; friable when moist; fine roots abundant; neutral; abrupt, smooth boundary.

A_{p2} 1 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable when moist; many fine roots; slightly acid to neutral; abrupt, smooth boundary.

Subsoil—

B_2 7 to 22 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, subangular blocky structure; friable when moist; many fine roots in upper part, few in lower part; medium acid to slightly acid; abrupt, smooth boundary.

B_{3m} 22 to 48 inches +, evenly and prominently mottled yellowish-brown (10YR 5/6), brown (10YR 5/3), and yellowish-red (5YR 4/8), heavy silt loam or light silty clay loam; strong, thick, platy structure; firm when moist; fine network of roots between some horizontal faces; many yellowish-red (5YR 4/6) clayskins; this is a siltpan, or fragipan, horizon; medium acid; normally underlain by waterworn gravel.

The depth to the mottled fragipan horizon ranges from about 16 to about 26 inches. The gravelly substratum is at depths of about 40 inches or more. In some shallow areas bedrock is at a depth of about 36 inches.

The Captina soils are not very extensive in the county. However, they are used for most crops grown in the area and are fairly productive under good management. The moisture-supplying capacity is moderate to low. Because internal drainage is slow, these soils are wet at times and are slow to dry out. In wet seasons the water table is sometimes in the gravelly substratum or even in the B_3 horizon. Although above the normal high-water level, these soils are covered by water during major floods.

Captina silt loam, 0 to 3 percent slopes (CbA).—The profile of this soil is like that described as representative of the series. Because this soil is nearly level, surface drainage is slow and excess water is more of a problem than erosion. If drained, however, this soil can be used for most crops grown in the area. It is in capability unit IIw–2.

Captina silt loam, 3 to 8 percent slopes, moderately eroded (CbB2).—Surface drainage generally is adequate on this soil because of the slope. However, slow internal drainage intensifies runoff and tends to accelerate erosion. For this reason, this soil is in capability unit IIe–14. Included are 8 acres that have slopes steeper than 8 percent and 15 acres that are more severely eroded than the rest of this soil.

Chester series

The Chester series consists of deep, well-drained soils that developed from materials weathered from mica schist or granitized schist. These soils are on the rolling uplands of the Piedmont Plateau near the Manor and Glenelg soils.

Profile of Chester silt loam, 0 to 3 percent slopes, in a forested area about 1½ miles northwest of Olney:

Surface soil—

A_{00} 2 to ½ inch, loose litter of hardwood leaves.

A_0 ½ to 0 inch, decomposed leaf mold.

A_1 0 to 1 inch, very dark grayish-brown (10YR 3/2), light silt loam; weak, fine, granular structure; loose; roots abundant; strongly acid; abrupt, smooth boundary.

A_2 1 to 8 inches, brown (7.5YR 4/4) silt loam; weak, fine, subangular blocky to weak, medium, granular structure; friable when moist; roots plentiful; very strongly acid; abrupt, smooth to wavy boundary.

Subsoil—

B_1 8 to 11 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable to somewhat firm when moist; roots fairly plentiful; very strongly acid; clear, smooth to wavy boundary.

B_{21} 11 to 23 inches, yellowish-red (5YR 4/6) silty clay loam; strong, medium to coarse, subangular blocky structure; firm when moist; some large tree roots; common, fine and medium pores; faint but continuous clayskins; very strongly acid; gradual, wavy boundary.

B_{22} 23 to 33 inches, yellowish-red (5YR 4/8) silty clay loam; strong, coarse, subangular blocky structure; firm when moist; some large tree roots; common, fine pores; distinct, continuous clayskins; very strongly acid; gradual to clear, wavy boundary.

B_3 33 to 40 inches, dark-brown (7.5YR 4/4), heavy silt loam; moderate, medium, subangular blocky structure; friable to firm when moist; a very few large tree roots; fine pores common; faint to distinct, more or less continuous clayskins; strongly acid; clear to abrupt, wavy boundary.

Substratum—

C 40 to 48 inches +, variable reddish-yellow and red (7.5YR 6/8 and 2.5YR 4/6), highly weathered mica schist of gritty loam texture; no visible structure; friable when moist; strongly acid.

The native vegetation was mostly oak but included some maple and dogwood.

In places the surface soil is a little more grayish than that shown in the representative profile, and in most places the depth to the substratum is only 30 to 33 inches. Mica flakes are common, particularly in the B_3 and C horizons. In some places a few gravel fragments, generally quartzite, are on the surface or in the soil.

In addition to being deep and well drained, the Chester soils are fertile, have a high moisture-supplying capacity, are fairly easy to work, and under good management are very productive. They are among the better agricultural soils of the county and are used for all crops commonly grown in the area. They are fairly extensive and are important to the economy of the county.

Chester silt loam, 0 to 3 percent slopes (ChA).—The profile of this soil is like that described as representative of the series. This soil is easily managed and can be cultivated without risk of damage if good management practices are used. It is in capability unit I–4.

Chester silt loam, 0 to 3 percent slopes, moderately eroded (ChA2).—Erosion has damaged this soil, and careful management is needed to prevent further damage. This soil is in capability unit IIe–4.

Chester silt loam, 3 to 8 percent slopes, moderately eroded (ChB2).—This soil is the most extensive in the Chester series. If fairly well managed it is suitable for cultivation, but it should be protected from further erosion by contour tillage, stripcropping, and other protective practices. This soil is in capability unit IIe–4.

Chester silt loam, 3 to 8 percent slopes, severely eroded (ChB3).—Most of the original surface soil and some of the subsoil have been removed from this soil by erosion. Some gullies have formed, but most of them are shallow. If cultivated, this soil needs intensive management practices. It is in capability unit IIIe–4.

Chester silt loam, 8 to 15 percent slopes, moderately eroded (ChC2).—Although this soil is on stronger slopes than Chester silt loam, 3 to 8 percent slopes, severely eroded, it is less damaged by erosion. Nevertheless, as erosion is always a hazard on soils this steep, this soil has been put in capability unit IIIe–4. Included are about 15 acres that have a gravelly surface soil.

Chester silt loam, 8 to 15 percent slopes, severely eroded (ChC3).—Erosion has removed much more of the soil material from this soil than from Chester silt loam, 8 to 15 percent slopes, moderately eroded, but about the same practices are needed to control erosion. These practices, however, should be more carefully and intensively applied. This soil is in capability unit IVe–3.

Chewacla series

The Chewacla series consists of moderately well drained soils. They developed from fine materials washed mainly from soils derived from crystalline rocks. In the areas where the parent materials originated, the dominant soils are the Manor, Chester, and Glenelg soils.

The Chewacla soils occur only on flood plains on the Piedmont Plateau. They are near the better drained Congaree soils and the poorly drained Wehadkee soils. Because of somewhat impeded drainage, the Chewacla soils are mottled below depths of 18 to 20 inches.

Profile of Chewacla silt loam, 0 to 3 percent slopes, in a pastured area on the flood plain of the Hawlings River just south of the Unity Road Bridge:

Surface soil—

A_{11} 0 to ½ inch, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; loose; abundant fine roots; strongly acid; abrupt, smooth boundary.

A_{12} ½ to 18 inches, dark-brown (10YR 4/3) silt loam; very weak, thin, platy structure; friable when moist; many fine roots to a depth of 4 inches, fewer below 4 inches; very strongly acid; abrupt, smooth boundary.

Substratum—

C_{1g} 18 to 20 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, prominent mottles of brown (10YR 4/3), yellowish red (5YR 4/6), and black (10YR 2/1); weak, thin, platy structure, probably due to stratification; friable when moist; contains some very thin lenses or stratifications of micaceous loam; very strongly acid; abrupt, smooth boundary.

C_{2g} 20 to 25 inches, light brownish-gray (2.5Y 6/2), light silty clay loam; many, fine to medium, distinct mottles of dark brown (10YR 4/3), yellowish red (5YR 4/6), and black; moderate, coarse, blocky structure in place, but crumbles on removal to weak, medium plates; friable when moist; some dark grayish-brown (10YR 4/2) silt coatings; near lower boundary, base color becomes dark gray (10YR 4/1) and there are some coarse, faint mottles of gray (10YR 5/1); very strongly acid; abrupt, smooth boundary.

C_{3g} 25 to 48 inches +, light-gray (10YR 6/1) silty clay; common, fine, distinct mottles of strong brown (7.5YR 5/6); very weak, very coarse, blocky structure; firm when moist; some light brownish-gray (10YR 6/2) silt or clay coatings; very strongly acid.

The C horizon varies in texture and color, and in many places the lower part is somewhat sandy. In some areas, the color is more drab (2.5Y and 5Y) than that described in the representative profile, and the mottles are coarser and more abundant. In places a sandy and gravelly D horizon is at depths of less than 40 inches.

The Chewacla soils are wet for long periods and have a seasonally high water table. The moisture-supplying capacity, however, is moderate to moderately low. These soils are frequently flooded but are under water for only short periods. If artificially drained, they can be used for crops. Most areas are used for pasture. Only one Chewacla soil is mapped in the county, but it is fairly extensive.

Chewacla silt loam, 0 to 3 percent slopes (CkA).—The profile of this soil is like that described as representative of the series. If adequately drained and protected from floods, this soil can be cultivated. It has, therefore, been put in capability unit IIw–7. Most of the acreage probably will remain in pasture. Included are scattered areas totaling about 64 acres that have slopes of slightly more than 3 percent.

Chillum series

The Chillum series consists of moderately deep to deep, well-drained soils that developed in a thin mantle of silt

overlying old, partly cemented sandy and gravelly deposits, probably post-glacial outwash from the Potomac River system. There has been enough geologic erosion to permit the development of good drainage.

The Beltsville and Leonardtown soils developed in similar materials but where there has been less geologic dissection. The Beltsville soils are moderately well drained, and the Leonardtown soils are somewhat poorly drained. Both have well-developed siltpans, or fragipans, above the cemented substratum.

Profile of Chillum silt loam, 3 to 8 percent slopes, moderately eroded, in a forested area on the University of Maryland farm near Fairland:

Surface soil—

A_{00} ½ to 0 inch, loose hardwood leaves.

A_1 0 to 1 inch, dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; strongly acid; abrupt, smooth boundary.

A_{21} 1 to 5 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; contains inclusions of A_1 material; strongly acid; abrupt, smooth boundary.

A_{22} 5 to 8 inches, brown (10YR 4/3) silt loam; very weak, thin, platy structure; friable when moist; roots numerous; strongly acid; abrupt, smooth boundary.

Subsoil—

B_1 8 to 13 inches, brown (7.5YR 4/4) silt loam; compound structure—very weak, fine and medium, subangular blocky and weak, fine and medium, granular; fine pores common; some faint clayskins, slightly darker in color; very strongly acid; abrupt, smooth boundary.

B_2 13 to 26 inches, yellowish-red (5YR 4/6), heavy silt loam to light silty clay loam; moderate, medium and coarse, subangular blocky structure; roots fairly numerous; many very fine pores; continuous, self-colored clayskins; strongly acid; abrupt, smooth boundary.

Substratum—

D_1 26 to 30 inches, coarsely and distinctly mottled, yellowish-brown (10YR 4/4), brown (10YR 5/3), and pale-brown (10YR 6/3) gravelly sandy loam; massive; slightly cemented or indurated; very hard to extremely hard when dry and very firm to extremely firm when moist or wet; a few, fine roots in widely spaced cracks or fissures; 10 to 20 percent pebbles, ½ to 1 inch in diameter; some yellowish-red (5YR 4/6) clayskins on pebbles and within the common, rather large pores; very strongly acid; abrupt, smooth boundary.

D_2 30 to 48 inches +, similar to D_1 except 50 to 80 percent gravel; very strongly weathered; contains some thin strata of hard ironstone, next to which the gravelly material may be yellowish red in color; very thick.

Where pebbles are mixed with the silty mantle, the A and B horizons are gravelly. In places the B_2 horizon is silty clay loam, fine sandy clay loam, or fine sandy clay. In some areas the cemented substratum is at depths of about 36 inches, but in eroded areas the substratum is closer to the surface and in some places is exposed. Where these soils grade into the Beltsville soils, some faint, gray mottles occur in the extreme lower part of the B_2 horizon just above the cemented layer. Where these soils grade into the Sassafras soils, the cemented layer is very weak; it is very soft when moist but harder and somewhat brittle when dry.

The Chillum soils are well drained. They have moderate moisture-holding capacity except where they are severely eroded. If adequately fertilized and otherwise well managed, they are fairly productive, but they need to be protected against erosion.

These soils are fairly extensive in the county. A large part of the acreage is in suburban residential areas. Most of the acreage is on the fringe of the Coastal Plain, next to the Prince Georges County line, between Burtonsville and the District of Columbia. But Chillum soils also occur in the extreme western part of the county, in the vicinity of Martinsburg and Elmer. Here, they are on remnants of old deltas in the bend of the Potomac River and are mixed with the Penn soils. These areas generally are not continuous but consist of scattered patches of Chillum soil material underlain by red shale and sandstone. The soil that developed from the red shale and sandstone, where it was exposed between areas of Chillum soils, is Penn gravelly silt loam. In many places red Penn soil has been mixed with brown to yellowish-red Chillum soil, so that the entire soil is red like the Penn yet contains outwash gravel like the Chillum. In use suitability, these areas are more like the Chillum soils than the Penn. The Penn soils are described in detail elsewhere in this section.

Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded (ClB2).—The profile of this soil is like that described as representative of the series except that pebbles, mostly less than 1 inch in diameter, make up about 10 to 20 percent of the surface soil and subsoil. Most areas have slopes of more than 3 percent, but a few are nearly level. Because this soil is eroded and susceptible to further erosion, it has been put in capability unit IIe–7.

Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded (ClB3).—To be cultivated safely, this soil requires careful management and practices to control erosion. Because of this, it has been put in capability unit IIIe–7. Included are some small areas that have less than the normal amount of gravel in the surface soil.

Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded (ClC2).—Although this soil is not severely eroded, the strong slopes make it susceptible to further erosion. It is in capability unit IIIe–7.

Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded (ClC3).—This soil has lost nearly all of the original surface soil and, in places, part of the subsoil through erosion. If it is to be used without further damage, cultivated crops should be planted infrequently and in long rotations. This soil is in capability unit IVe–7. A few small areas contain less gravel than the rest of this soil.

Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded (ClD2).—This soil is moderately steep but is not severely eroded, partly because most of it is in forest. If properly managed and protected from erosion, this soil can be used infrequently for cultivated crops. It is in capability unit IVe–7.

Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded (ClE2).—Because of the hazard of erosion, this soil should not be cultivated. It can be used as pasture or forest. It is in capability unit VIe–2. Included are 3 acres that are severely eroded and are designated on the soil map by erosion symbols.

Chillum silt loam, 3 to 8 percent slopes, moderately eroded (CmB2).—The profile of this soil is like that de-

scribed as representative of the series. This soil is the most extensive of the Chillum soils and the most important agriculturally. Because it is eroded and susceptible to further erosion, it is in capability unit IIe–7. Included are a few nearly level areas that could not be shown separately on the soil map.

Chillum silt loam, 8 to 15 percent slopes, moderately eroded (CmC2).—This soil is less extensive than Chillum silt loam, 3 to 8 percent slopes, moderately eroded. It needs more careful management if it is to be cultivated safely. It is in capability unit IIIe–7.

Chillum silt loam, 15 to 25 percent slopes, moderately eroded (CmD2).—This soil is not severely eroded but is susceptible to further erosion if cultivated frequently or without suitable practices to control erosion. For this reason, it is in capability unit IVe–7.

Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded (CnB2).—If cultivated, these soils need suitable rotations and other good management practices. Cultivation should be on the contour if possible. These soils are in capability unit IIe–7.

Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded (CnB3).—These soils are gently sloping, but most of the original surface soil and, in places, part of the subsoil have been lost through erosion. However, only a few gullies have formed. This soil is in capability unit IIIe–7.

Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded (CnC2).—Although these soils are steeper than Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded, they are less severely eroded. The hazard of further erosion is great, however, so these soils are in capability unit IIIe–7.

Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded (CnD3).—In most places these soils have lost all of the original surface soil and much of the subsoil through erosion. A few gullies have formed, and some are quite deep. If these soils are cultivated at all, rotations should be long and tilled crops should be grown infrequently. A safer use is pasture. These soils are in capability unit VIe–2. Included are 6 acres that have slopes of more than 25 percent. This acreage is in forest and should remain in forest.

Chrome series

The Chrome series consists of well-drained, shallow to very shallow soils that developed from materials weathered from serpentine. These soils have a heavy, slowly to very slowly permeable subsoil. They occupy rather strongly sloping uplands on the Piedmont Plateau and are commonly adjacent to or associated with the Conowingo, Neshaminy, Aldino, and Calvert soils. The Conowingo soils are only moderately well drained and are mottled in the lower part of the subsoil. The Aldino and Calvert soils are less well drained than the Conowingo soils, but they developed on the same kind or a similiar kind of material. The Neshaminy soils are deep and well drained; they developed from a mixture of parent material, including some weathered from serpentine.

Profile of Chrome silt loam, 8 to 15 percent slopes, moderately eroded, in a forested area on Piney Meeting House Road south of Hunting Hill:

Surface soil—

- A_{00} 1½ to ½ inch, leaf litter, mostly pine needles.
- A_0 ½ to 0 inch, almost black, decomposed leaf mold.
- A_1 0 to 1 inch, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, granular structure; friable when moist; strongly acid to very strongly acid; abrupt, smooth boundary.
- A_2 1 to 8 inches, light olive-brown (2.5Y 5/6) silt loam; weak, fine, subangular blocky to weak, fine, granular structure; friable when moist but plastic and sticky when wet; roots fairly plentiful; strongly acid to very strongly acid; abrupt, smooth boundary.

Subsoil—

- B_2 8 to 12 inches, yellowish-brown (10YR 5/4), heavy silty clay loam or light silty clay; moderate, very fine, blocky structure; very hard when dry, friable to somewhat firm when moist and sticky and very plastic when wet; very few roots; slowly permeable and has few fine pores; very strongly acid; abrupt, smooth to wavy boundary.

Substratum—

- C 12 to 24 inches, fragmental, partially weathered serpentine; some pockets of dark yellowish-brown (10YR 4/4) silty clay loam to clay variegated with light olive brown (2.5Y 5/6); fine material has moderate, fine, blocky structure; friable when moist but plastic and sticky when wet; no roots; very slowly permeable; strongly acid; clear to abrupt, irregular boundary.
- D_r 24 inches +, hard, unweathered serpentine.

The forest is mostly Virginia pine.

The representative profile is typical of the normal, uneroded soil, but in some eroded areas the surface soil is the former subsoil and contains fragments of rock and additional organic matter. In some badly eroded areas, the original C horizon or the bedrock is at the surface.

These soils are difficult to work and are low in natural fertility. Although normally well drained, they are wet after rains or thaws because water percolates slowly through the subsoil. Because of shallowness, they tend to bake in long dry seasons. They are little used for agriculture.

These soils are fairly extensive in the county. In some areas, particularly on intermediate slopes, they are difficult to separate from the Conowingo soils. In these areas, the Chrome soils and the Conowingo soils are mapped together. A detailed description of the Conowingo soils is given elsewhere in this report.

Chrome silt loam, 8 to 15 percent slopes, moderately eroded (CoC2).—The profile of this soil is like that described as representative of the series. Because the hazard of erosion is high, this soil is in capability unit IIIe–13. Included with this mapping unit are about 39 acres that have some serpentine gravel in the surface soil.

Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded (CpD2).—In addition to being stony to very stony, this soil is shallow, wet, and, in places, eroded. It is not suited to cultivation or improved pasture but should be kept in forest. Trees may not be profitable as timber, but they will protect the soil from runoff and provide some cover for wildlife. This soil is in capability unit VIIs–2. Included are about 11 acres that are gravelly instead of stony but, because of erosion and steepness, need the same kind of management.

Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded (CrB2).—The two soils in this unit are similar in characteristics and need about the same kind of management. Because of the tight, slowly

permeable subsoil, runoff is rapid and the hazard of erosion is great. These soils are in capability unit IIIe–13.

Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded (CrB3).—These soils have lost all or nearly all of their original surace soil through erosion, but, if carefully managed and protected from erosion, they can be cultivated. They are in capability unit IIIe–13.

Colluvial land

Within the fringe of the Coastal Plain, along the eastern and southeastern borders of the county, are many small depressed areas that have been filled with fine materials washed from adjacent higher slopes. This material has some profile characteristics but is too variable to be designated as a soil series. The surface texture is mostly silt loam. Most areas have a siltpan, or fragipan. Drainage varies from good to poor.

This colluvial land is used for agriculture and is quite productive under good management. Except for alfalfa and fruit trees, most common crops of the Coastal Plain are grown. Because the individual areas are small, they are commonly used and managed in the same manner as the surrounding, more extensive Sassafras, Chillum, Croom, Beltsville, or Leonardtown soils.

Colluvial land (Cs).—In nearly all areas of Colluvial land, drainage is impeded to some degree, so this land is in capability unit IIw–8.

Congaree series

The Congaree series consists of deep, well-drained, acid soils on flood plains. These soils developed from fine materials washed from soils underlain by acid, crystalline rocks and deposited by overflow along rivers and streams. The areas from which these materials washed are occupied by the Manor, Chester, and Glenelg soils. The Congaree soils occur on the same bottom lands as the moderately well drained Chewacla soils and the poorly drained Wehadkee soils.

Profile of Congaree silt loam, 0 to 3 percent slopes, in a cultivated area on Germantown Road about 500 feet east of Seneca Creek Bridge:

Surface soil—

1_p. 0 to 6 inches, dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; loose; many fine roots and pores; medium acid; abrupt, smooth boundary.

Subsoil—

2. 6 to 36 inches, brown (7.5YR 4/4) silt loam; weak, thin, platy structure; friable when moist; many fine roots in upper 12 inches; many fine pores; strongly acid; gradual, smooth boundary.

Substratum—

3. 36 to 60 inches +, strong-brown (7.5YR 5/6) gravelly silt loam; moderate, coarse, subangular blocky structure; friable when moist; about 50 percent rounded schist and fragments of quartzite gravel; strongly acid. This horizon is the immediate substratum, but is underlain at greater depths by a sandy, more gravelly or cobbly stratum that was deposited earlier.

These soils have little profile development. Except where cultivated, they consist of almost unaltered fine sediments. The depth to the gravelly substratum ranges from 2 to 5 feet. In a few places, there are mottles below a depth of 36 inches. There are some very thin inclusions, or lenses, of highly micaceous material or of fine sand. In some local areas, particularly on natural levees next to streams, there is a thin overwash of gritty or sandy material.

The Congaree soils are productive under good management and are used for most crops grown in the area. In addition to being deep and well drained, they are easily worked and are high in moisture-supplying capacity. During periods of high water when streams overflow, they are subject to flooding, but they are not flooded every year. These flood periods are short and are not likely to affect late-planted crops.

Only one Congaree soil is mapped in the county. It is not extensive but is important where it occurs.

Congaree silt loam, 0 to 3 percent slopes (CtA).—This soil is nearly level and uneroded. Except for the hazard of flooding, it has no serious management problems. It is in capability unit I–6. Included are 9 acres that have slopes of slightly more than 3 percent.

Conowingo series

The Conowingo series consists of soils that developed from serpentine on the Piedmont Plateau. These soils are similar to the Chrome soils except that they are somewhat deeper and are only moderately well drained or somewhat poorly drained. They are generally more nearly level than the Chrome soils, and, because drainage is slow, they remain wetter for longer periods. Where it was not practical to separate the Conowingo and Chrome soils, they are mapped together and are described under the Chrome series.

Profile of Conowingo silt loam, 0 to 3 percent slopes, moderately eroded, in a cultivated area:

Surface soil—

A_p 0 to 9 inches, light olive-brown (2.5Y 5/4) silt loam; moderate, fine to medium, crumb structure; friable when moist and sticky when wet; strongly acid; clear, smooth boundary; horizon is 8 to 10 inches thick.

Subsoil—

B_{21} 9 to 17 inches, yellowish-brown (10YR 5/4) silty clay loam; strong, medium, blocky structure; firm when moist and plastic and sticky when wet; roots fairly plentiful; some thin, clay coatings and black films on blocks; very strongly acid; clear, wavy boundary; horizon is 5 to 10 inches thick.

B_{22} 17 to 27 inches, yellowish-brown (10YR 5/4), heavy silty clay loam; common, medium, distinct mottles of olive gray, light olive brown, and strong brown (5Y 5/2, 2.5Y 6/6, and 7.5YR 5/6); strong, medium, blocky structure; firm when moist and plastic and sticky when wet; very few roots; heavy, clay coats and some black films on blocks; very strongly acid; clear, wavy boundary; horizon is 8 to 12 inches thick.

B_{23} 27 to 32 inches, olive-gray (5Y 5/2) silty clay loam; common, coarse, distinct mottles of strong brown (7.5YR 5/6); moderate, medium to coarse, blocky structure; firm when moist and plastic and sticky when wet; no roots; strongly to very strongly acid; gradual, wavy boundary; horizon is 4 to 10 inches thick.

Substratum—

C_1 32 to 46 inches, strong-brown (7.5YR 5/8) silt loam consisting of decomposed serpentine schist that has abundant, black, manganic specks and coatings; no roots; medium acid; diffuse boundary; horizon is 8 to 15 inches thick.

C_2 46 to 56 inches, highly variegated, soft saprolite of serpentine schist; slightly acid.

The Conowingo soils are rather shallow and in places badly eroded. Because the subsoil and substratum are slowly to very slowly permeable, water stands in depressions and the soils tend to be wet. On the other hand, these soils have very low moisture-supplying capacity and are droughty in long dry periods. They are suited to cultivation but are hard to manage and are used mostly for pasture and an occasional hay crop. Small housing developments are on some areas of these soils.

Conowingo silt loam, 0 to 3 percent slopes, moderately eroded (CvA2).—The profile of this soil is like that described as representative of the series. This soil is nearly level, and wetness is a more serious problem than erosion. It is in capability unit IIw–11.

Conowingo silt loam, 0 to 3 percent slopes, severely eroded (CvA3).—Both wetness and erosion are management problems on this soil. Erosion is the more serious hazard, so this soil is in capability unit IIIe–13.

Croom series

The Croom series consists of somewhat excessively drained soils that developed from old alluvial outwash of sandy gravel. These soils are porous and water passes rapidly through them. They occur on the upper fringe of the Coastal Plain, near the Prince Georges County line, generally adjacent to the Beltsville and Chillum soils.

Profile of a Croom gravelly loam, 3 to 8 percent slopes, moderately eroded, in a forested area in Prince Georges County:

Surface soil—

A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2), light gravelly loam; weak, fine, granular structure; loose; strongly acid.

A_{21} 2 to 7 inches, grayish-brown (2.5Y 5/2), light gravelly loam; compound structure—weak, fine, subangular blocky and weak, very fine, granular; friable to very friable when moist; very strongly acid.

A_{22} 7 to 12 inches, pale-yellow (2.5Y 7/4), light gravelly loam; very weak, fine, granular structure to single grain (structureless); very friable when moist; very strongly acid.

Subsoil—

B_2 12 to 28 inches, yellowish-brown (10YR 5/6), extremely gravelly sandy clay loam that has a few streaks and spots of strong brown (7.5YR 5/8); massive; moderately to strongly cemented; very hard when dry and very firm when moist or wet; at least 60 percent gravel, mostly fine, firmly cemented into the matrix; some dark-brown (10YR 4/4), thin clayskins on gravel surfaces; this is not a normal subsoil; it is called a B horizon only because it is a little heavier in texture (aside from gravel content) than the layers above; very strongly acid.

Substratum—

C 28 to 40 inches, yellowish-brown (10YR 5/4), slightly clayey, gravelly sand or sandy gravel; massive; somewhat cemented; hard when dry and firm when moist or wet; a few streaks, spots, and thin clayskins of reddish yellow and strong brown (5YR 5/8 and 7.5YR 5/8) on gravel surfaces; very strongly acid.

D 40 inches to 10 feet +, stratified yellow, brown, and gray gravel, mostly fine; loose to somewhat firm.

The forest was mostly scrub oak or blackjack oak but included some tulip-poplar and a little dogwood.

In some local spots, the texture of the surface soil is a little more sandy than in the representative profile. The depth to and thickness of the cemented B_2 horizon are variable. In some places the B horizon can be distinguished only by color, but in most places it has a little more clay and silt than the A horizon. In some strongly dissected and badly eroded areas, the cemented B horizon is exposed.

The Croom soils are droughty and are low in fertility. Generally, they are not used for agriculture.

Croom gravelly loam, 3 to 8 percent slopes, moderately eroded (CwB2).—The profile of this soil is like that described as representative of the series. This soil is in capability unit IIe–7. Included are 33 acres of a soil that is similar to this soil but has somewhat redder subsoil and, if of greater extent, would probably be recognized as a soil of the Aura series. Because of the limited extent of this included soil, it was not mapped separately.

Croom gravelly loam, 8 to 15 percent slopes, moderately eroded (CwC2).—This soil needs more intensive erosion control practices than Croom gravelly loam, 3 to 8 percent slopes, moderately eroded, if it is cultivated. It is in capability unit IIIe–7. Included are 16 acres of Croom gravelly sandy loams and about 12 acres that have a somewhat redder subsoil.

Croom gravelly loam, 8 to 15 percent slopes, severely eroded (CwC3).—This soil is so severely eroded that cultivation is hazardous unless intensive practices are used to control further erosion. It is in capability unit IVe–7.

Croom gravelly loam, 15 to 25 percent slopes, moderately eroded (CwD2).—This soil is not severely eroded but is so steep that it has been put in capability unit IVe–7. Included are about 5 acres that are redder than this soil and 2 acres that are more sandy.

Croom gravelly loam, 15 to 25 percent slopes, severely eroded (CwD3).—This soil has lost most of the original surface soil and, in places, some of the subsoil, but it can be cultivated infrequently if special protective practices are used. It is in capability unit VIe–2.

Croom gravelly loam, 25 to 45 percent slopes, moderately eroded (CwE2).—This soil is so steep that cultivation is not practical even under intensive conservation practices. If carefully managed, it can be used safely for pasture. It is in capability unit VIe–2. Included is a small acreage that is more sandy than normal.

Croom gravelly loam, 25 to 45 percent slopes, severely eroded (CwE3).—This soil is not suitable for cultivation or pasture. It should be kept in permanent vegetation and protected from any disturbance, including grazing and fire. Virginia pine would make a good protective cover. This soil is in capability unit VIIe–3. Included are 9 acres that have slopes of slightly more than 45 percent.

Croton series

The Croton series consists of poorly drained soils that developed from materials weathered from dark-red shale and sandstone of Triassic age. The upper part of the subsoil is heavy, and the lower part is a strong siltpan, or fragipan. Some of the Croton soils in the county are partly colluvial and have surface material that washed from the adjacent, slightly higher Penn, Lewisberry, Readington, and Bucks soils.

The Croton soils occur on upland flats and around the heads of drains. Most areas are west of Dawsonville,

Beallsville, and Dickerson, but some are between Dawsonville and Bucklodge.

Profile of Croton silt loam, 0 to 8 percent slopes, in an idle area on Cattail Road 1 mile northeast of Poolesville:

Surface soil—

A_{p1} 0 to 1 inch, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable when moist; strongly acid; abrupt, smooth boundary.

A_{p2} 1 to 6 inches, brown (10YR 4/3) silt loam; few, faint, fine mottles of yellowish brown (10YR 5/8); moderate, coarse, crumb to weak, fine, subangular blocky structure; friable when moist; strongly acid; abrupt, smooth boundary.

Subsoil—

B_{1g} 6 to 15 inches, yellowish-brown (10YR 5/8) silty clay; fairly common, medium, distinct mottles of grayish brown (2.5Y 5/2); moderate, fine to coarse, blocky structure; firm when moist and plastic and sticky when wet; very few roots; a few very irregular clayskins; very strongly acid; abrupt, smooth boundary.

B_{21g} 15 to 24 inches, reddish-brown (5YR 4/3) clay; many, medium, distinct mottles of strong brown (7.5YR 5/6) and grayish brown (10YR 5/2); strong, coarse, blocky structure; firm when moist and plastic and sticky when wet; practically no roots; some grayish coatings, apparently of silt; very strongly acid; gradual, smooth boundary.

B_{22mg} 24 to 36 inches, dark reddish-brown (2.5Y 3/4) silty clay loam to clay loam; fine, scattered mottles of reddish brown (5YR 4/6), light gray (5YR 6/1), and black; compound structure—moderate, thick, platy and strong, fine, subangular blocky; hard when dry and firm and brittle when moist; no roots; this is a very slowly permeable fragipan; very strongly acid; abrupt, smooth boundary.

Substratum—

C_{1g} 36 to 44 inches, dark reddish-brown (2.5YR 3/4) silty clay loam; many fine mottles of red (2.5YR 4/8), yellowish red (5YR 5/8), light gray (5YR 6/1), and black; massive; friable to firm when moist and plastic when wet; no roots; strongly acid; gradual, wavy boundary.

C_2 44 to 48 inches, structureless, weathered sandstone and shale.

D_r 48 inches +, hard, unweathered sandstone and shale

The vegetation was mostly weeds but included some alder.

The Croton soils vary greatly in drainage and in thickness of the surface layer. In some areas, particularly on the fringe of the uplands, these soils are not so wet and the subsoil is less mottled. In other places, particularly near the center of a soil area, they are wetter and the surface soil is more grayish or almost black. Some areas are covered by a layer of colluvial material from 15 to 20 inches thick.

The Croton soils occur in small, widely scattered areas. They are wet most of the time and are used mostly for pasture. Only one Croton soil is mapped in the county, but it is fairly extensive.

Croton silt loam, 0 to 8 percent slopes (CxA).—Most areas of this soil are nearly level, but some areas, next to the residual uplands, have slopes as steep as 8 percent. This soil is wet, and artificial drainage is not practical, so the soil is in capability unit Vw–2. It is best suited to pasture.

Edgemont series

The Edgemont series consists of moderately deep to deep, well-drained, strongly acid soils that developed from materials weathered from quartzite. These soils occur on elevated ridges on the Piedmont Plateau, generally above the Manor and Glenelg soils.

Profile of Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded, in a forested area one-half mile northeast of Mt. Ephraim near the Frederick County line:

Surface soil—

A_{00} 2 to ½ inch, loose litter of hardwood leaves.

A_0 ½ to 0 inch, leaf mold.

A_1 0 to ½ inch, black (5YR 2/1) gravelly sandy loam; weak, fine, granular structure; loose; many fine roots; very strongly acid; abrupt, smooth boundary.

A_{21} ½ to 1 inch, a very thin, gray, leached layer; the A_2 horizon of a very thin soil superimposed on another soil.

B_h 1 to 2 inches, dark grayish-brown (10YR 4/2) gravelly sandy loam; weak, fine, granular structure; loose; this is the B horizon of the superficial soil.

A_{22} 2 to 12 inches, light olive-brown (2.5Y 4/2) gravelly sandy loam; very weak, medium, subangular blocky structure; friable when moist; fine roots plentiful; very strongly acid; abrupt, smooth boundary.

Subsoil—

B_{21} 12 to 17 inches, yellowish-brown (10YR 5/4), light gravelly sandy clay loam; weak, medium, subangular blocky structure; hard when dry and firm when moist; very strongly acid; abrupt, smooth boundary.

B_{22} 17 to 25 inches, yellowish-brown (10YR 5/8) gravelly sandy clay; weak, medium, subangular blocky structure; friable when moist; very strongly acid; abrupt, smooth boundary.

Substratum—

C 25 to 36 inches +, gravelly, strongly weathered quartzite; very strongly acid.

The forest was white oak and black oak and some hickory.

In some local areas, the texture throughout the profile is somewhat heavier than that described in the representative profile and there are spots of gravelly loam and silt loam. In many areas, the soils are deeper to the substratum. The gravel content varies throughout the profile, and there are scattered stones of quartzite in some places.

The Edgemont soils are strongly acid and low in fertility. They are of limited extent in the county and generally are not used for agriculture. Most of the acreage is in forest.

Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded (EdB2).—This soil is strongly acid and rather low in natural fertility but can be used for crops if protected from further erosion. It is in capability unit IIe-25.

Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded (EdC3).—This soil has lost most of the original surface soil through erosion. If cultivated, it needs careful management to control erosion. It is in capability unit IVe–25. Included are 18 acres that are less severely eroded and 3 acres that have slopes of more than 15 percent.

Elioak series

The Elioak series consists of deep, well-drained, very red soils that developed from materials weathered in place from mica schist that contains large quantities of mica and many veins of white quartzite. These soils are mature and have strong horizons and structural development, particularly in the subsoil. They occur in relatively small isolated areas, mostly on ridgetops, on the rolling

uplands of the Piedmont Plateau. They are in the areas where the Manor, Glenelg, and Chester soils are dominant.

Profile of an Elioak silt loam in a hardwood forest just back of the Congressional Country Club about 5 miles west of Bethesda:

Surface soil—
- A_1 0 to 2 inches, dark reddish-brown (5YR 3/3) silt loam; moderate, fine, subangular blocky structure; slightly acid; abrupt, smooth boundary.
- A_2 2 to 8 inches, reddish-brown (5YR 4/4) silt loam; weak, fine, subangular blocky structure; friable when moist; medium acid; abrupt, smooth boundary; horizon is 4 to 6 inches thick.

Subsoil—
- B_1 8 to 13 inches, reddish-brown (2.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; slightly firm when moist; medium acid; clear, smooth boundary; horizon is 4 to 5 inches thick.
- B_{21} 13 to 24 inches, red (2.5YR 4/6), heavy silty clay loam; moderate to strong, medium, subangular blocky structure; slightly firm when moist; continuous clayskins, mostly self-colored but some slightly darker (2.5YR 3/6); medium to strongly acid; gradual, wavy boundary; horizon is 8 to 12 inches thick.
- B_{22} 24 to 44 inches, red (10R 4/6), micaceous silty clay loam; compound structure—weak to moderate, medium to very coarse, blocky and weak, medium, platy; somewhat firm when moist; clayskins prominent and slightly darker in color; a few coarse blotches of brownish yellow (10R 6/8) in lower part, probably inclusions of highly weathered parent material; medium to strongly acid; gradual, wavy boundary; horizon is 16 to 22 inches thick.

Substratum—
- C 44 to 96 inches +, red (2.5YR 5/6), micaceous silt loam; very coarse, blocky and platy structure; firm when moist; many inclusions of partially weathered, black, gray, and yellow mica schist.

In places there is a transitional B_3 horizon a few inches thick between the B_{22} and C horizons. Some remnants of quartzite veins occur as gravel fragments throughout the profile. Locally, the colors are less red and have hues of 7.5YR in the surface soil to 5YR in the subsoil.

In addition to being deep and well drained, the Elioak soils are moderately high to high in moisture-supplying capacity. They are not highly fertile but under good management can be made and kept productive. These soils are fairly extensive in the county and are used for most crops commonly grown in the area.

Elioak silt loam, 0 to 3 percent slopes (EeA).—The profile of this soil is like that described as representative of the series. Although this soil is not extensive, it is important where it occurs. It is in capability unit I–4.

Elioak silt loam, 3 to 8 percent slopes, moderately eroded (EeB2).—This soil is the most extensive in the series. It can be cultivated safely under relatively simple management and erosion control practices. It is in capability unit IIe–4.

Elioak silt loam, 8 to 15 percent slopes, moderately eroded (EeC2).—This soil is on the strongly sloping sides of ridges. Because of the slopes, careful management is needed to control further erosion, so this soil is in capability unit IIIe–4.

Elioak silty clay loam, 3 to 8 percent slopes, severely eroded (EkB3).—This soil has lost the original silt loam surface soil through erosion. The present surface layer is mostly original subsoil. Cultivation is hazardous, and special practices to control erosion are needed. This soil is in capability unit IIIe–4.

Elioak silty clay loam, 8 to 15 percent slopes, severely eroded (EkC3).—This soil is on steeper slopes than Elioak silty clay loam, 3 to 8 percent slopes, severely eroded, but can be cultivated if intensive practices are used to control further erosion. It is in capability unit IVe–3.

Elk series

The Elk series consists of deep, well-drained soils that developed on old alluvium washed from soils that originated from limestone. These soils occur on undulating to sloping, high river terraces, generally near the somewhat less well drained Captina soils. On adjacent lower terraces are the well-drained Ashton soils, which were derived from the same kind of material as the Elk soils but are less strongly developed.

Profile of Elk silt loam, 0 to 3 percent slopes, moderately eroded, in a forested area three-eighths of a mile east of the intersection of River Road and Elmer School Road:

Surface soil—
- A_{00} 3 to 0 inch, hardwood leaves.
- A_1 0 to ¼ inch, organic-stained mineral material.
- A_2 ¼ to 9 inches, dark yellowish-brown (10YR 4/4) silt loam; compound structure—very weak, thin, platy and moderate, fine, granular; loose; roots abundant; some rounded fragments of gravel; medium acid; gradual, smooth boundary.

Subsoil—
- B_1 9 to 16 inches, strong-brown (7.5YR 5/8) silt loam; compound structure—weak, thin, platy and weak, fine, subangular blocky; friable when moist; roots plentiful in upper part; some rounded fragments of gravel; strongly acid; gradual, smooth boundary.
- B_{21} 16 to 34 inches, yellowish-red (5YR 4/8) silty clay loam; moderate, fine, blocky structure; firm when moist; strongly acid; gradual, smooth to wavy boundary.
- B_{22} 34 to 46 inches, evenly and distinctly mottled yellowish-red (5YR 4/8), strong-brown (7.5YR 5/8), and light-gray (10YR 7/2) silty clay loam; weak, medium, platy structure; firm when moist; strongly acid; gradual, smooth to wavy boundary.
- B_3 46 to 58 inches, evenly and prominently mottled red (10R 4/8), light brownish-gray (10YR 6/2), and light olive-brown (2.5Y 5/6) silt loam; weak, thick, platy structure; firm when moist; some yellowish-red (5YR 5/8) clayskins; very strongly acid; gradual, smooth to wavy boundary.

Substratum—
- D 58 to 72 inches +, mottled pale-brown (10YR 6/3), yellowish-red (5YR 4/6), and strong-brown (7.5YR 5/8) fine sandy loam; weak, thick, platy structure; friable; very strongly acid; this is a separate, nonconforming stratum, not directly related to the horizons above.

The forest consisted of oak, beech, and hickory. The profile described is shallower to mottling than that of most soils in this series and grades to the Captina series. In many places there are no mottles above the B_3 horizon and few if any above the nonconforming D horizon. Some areas are more gravelly than others, but all areas are mapped as silt loam. In places the nonconforming D horizon consists of transported or residual, red, Triassic materials, mostly gravelly, that influence the color of the lower subsoil.

The Elk soils occur on high terraces along the Potomac River but are not extensive. They are moderately high to high in moisture-supplying capacity and are fertile

and productive. They are used for all crops commonly grown in the area and for high-quality pasture.

Elk silt loam, 0 to 3 percent slopes, moderately eroded (ElA2).—The profile of this soil is like that described as representative of the series. Although this soil is not extensive, it is important where it occurs. This soil can be cultivated safely and is productive under ordinary good management practices. It is in capability unit IIe–1.

Elk silt loam, 3 to 8 percent slopes, moderately eroded (ElB2).—This soil can be cultivated safely if carefully managed to control erosion. It is in capability unit IIe–1.

Elk silty clay loam, 8 to 15 percent slopes, severely eroded (EmC3).—The original silt loam surface layer of this soil has been removed by erosion, and the present surface soil is silty clay loam. Because this soil is subject to further erosion, it is in capability unit IVe–3.

Eroded land

Within the red shale and sandstone area in the western part of the county are areas where erosion has left a mass of rather finely divided, weathered, red shale. It is little more than shale parent material. In some local areas, a thin surface layer has developed that consists mostly of organic matter but includes some fine soil material. This shale material is similar to the material from which the Penn soils developed but cannot be classified as a soil of the Penn series. Instead, it is classified as Eroded land, Penn materials.

Eroded land, Penn materials (Ep).—If very carefully managed, this land type can be cultivated safely to a limited extent. It has slopes of 15 percent or less. It is in capability unit IVe–10.

Glenelg series

The Glenelg series consists of moderately deep, well-drained soils that developed from materials weathered from rather soft mica schist, or, in some places, from granitized schist or gneiss. These soils have a well-developed, textural subsoil that is substantially finer in texture than the surface soil.

Profile of Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded, in a cultivated area on Lewisdale-Green Valley Road about one-fourth of a mile northwest of Lewisdale:

Surface soil—

A_p 0 to 8 inches, dark-brown (7.5YR 4/4) channery silt loam; weak, fine, subangular blocky to coarse, crumb structure; friable when moist; roots plentiful; mica flakes common; about 20 percent fragments of channery phyllite; strongly acid; abrupt, smooth boundary.

Subsoil—

B_2 8 to 20 inches, yellowish-red (5YR 5/8) channery silty clay loam; moderate, fine, subangular blocky structure; friable when moist and plastic when wet; roots fairly common; continuous clayskins of yellowish red (5YR 5/6); mica flakes plentiful; about 15 percent fragments of channery phyllite; strongly acid; gradual, smooth to wavy boundary.

B_{3c} 20 to 37 inches, partly weathered phyllite in a matrix of yellowish-red (5YR 5/8), micaceous silt loam; matrix has moderate, fine, subangular blocky structure; friable when moist; a few roots; some discontinuous, yellowish-red (5YR 5/6) clayskins and a few, irregular, dark reddish-brown (5YR 3/2) stains on structural faces; about 50 percent partly weathered fragments of channery phyllite, many very small; very strongly acid; clear to abrupt, wavy to irregular boundary.

Substratum—

C 37 to 62 inches, weathered and partially weathered phyllitic schist.

D_r 62 inches +, hard, unweathered phyllite.

In some places the B_2 horizon is slightly thicker than that described and the B_{3c} horizon is somewhat thinner. The number of fragments varies considerably. Where soft schist replaces the phyllite, the soils grade to silt loam. Where the B horizon is finer textured than the A horizon, the soils grade to the Manor soil.

The Glenelg soils are the most extensive in the county. The soils that are not seriously eroded are moderate to moderately high in moisture-supplying capacity. They are only moderately deep but are productive and are used for most crops commonly grown in the county. The seriously eroded soils are shallow and have low moisture-supplying capacity. They tend to be droughty in periods of low rainfall and are limited in productivity.

Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded (GcB2).—The profile of this soil is like that described as representative of the series. Adequate practices to control erosion are needed to prevent further damage. This soil is in capability unit IIe–10.

Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded (GcB3).—Most of the original surface layer of this soil and, in places, part of the subsoil have been removed by erosion. Some gullies have cut deep into the subsoil. This soil can be used for crops if practices are used to control further erosion. It is in capability unit IIIe–10.

Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded (GcC2).—Because the hazard of erosion is great, this soil is in capability unit IIIe–10.

Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded (GcC3).—This soil cannot be cultivated continuously without suitable practices to control further erosion. A cultivated crop can be grown infrequently, in a long rotation of sod crops; or a special crop, such as an orchard crop, that needs little cultivation can be grown. This soil is in capability unit IVe–10.

Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded (GcD2).—If adequately protected, this soil can be cultivated to a limited extent or used for special crops. It is in capability unit IVe–10.

Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded (GcD3).—This soil is so badly damaged by erosion that it is not suitable for cultivation. It is shallow and droughty, and some gullies have formed. It should be kept in permanent vegetation. It can be used for permanent pasture if sod is well established but should not be overgrazed. It is in capability unit VIe–3.

Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded (GgB2).—This soil has fairly fine gravel on the surface and in the surface soil. Because it can be cultivated under simple management practices, it is in capability unit IIe–25.

Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded (GgB3).—This soil has lost most of the original

surface soil through erosion. It needs intensive management practices to prevent further soil loss, so it is in capability unit IIIe–25.

Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded (GgC2).—This soil is susceptible to further erosion unless carefully managed. Therefore, it is in capability unit IIIe–25.

Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded (GgC3).—This soil has had most of the original surface soil removed by erosion. Some shallow gullies have formed. Intensive management is needed if cultivated crops are grown. This soil is in capability unit IVe–25.

Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded (GgD2).—This soil can be cultivated for only short periods or to a very limited extent. Growing clean-tilled crops will cause further erosion. This soil is in capability unit IVe–25.

Glenelg silt loam, 0 to 3 percent slopes (GhA).—This soil is only slightly channery or gravelly. It can be cultivated safely under ordinary good farming practices. It is shallow, however, and subject to some hazards. Therefore, it is in capability unit IIe–25.

Glenelg silt loam, 3 to 8 percent slopes, moderately eroded (GhB2).—This soil is the most extensive in the county and, because of its extent, is important agriculturally. It occupies most of the gently sloping uplands of the Piedmont Plateau. Most of the acreage is in well-managed pasture. Some is still in forest. Only simple practices are needed to control erosion, so this soil is in capability unit IIe–25.

Glenelg silt loam, 3 to 8 percent slopes, severely eroded (GhB3).—This soil is on gentle slopes, but erosion has removed most of the surface soil and in places part of the subsoil. In some places shallow gullies are fairly numerous. If carefully managed this soil will produce good crops and pasture. Good management includes long rotations, contour tillage, and stripcropping. In places special management practices are needed. This soil is in capability unit IIIe–25.

Glenelg silt loam, 8 to 15 percent slopes, moderately eroded (GhC2).—This soil is strongly sloping, and the hazard of erosion is great. For this reason, it is in capability unit IIIe–25.

Glenelg silt loam, 8 to 15 percent slopes, severely eroded (GhC3).—This soil can be cultivated safely if intensively managed to control further erosion. It is in capability unit IVe–25.

Glenelg silt loam, 15 to 25 percent slopes, moderately eroded (GhD2).—Because this soil is so steep, it needs intensive practices to control erosion if it is used for even part-time or limited cultivation. It is in capability unit IVe–25. Included are a few spots that are deeper than the rest of this soil. Also included are a few spots that have a redder surface soil and subsoil and are somewhat gravelly on the surface.

Glenelg silt loam, 15 to 25 percent slopes, severely eroded (GhD3).—This soil is so steep that it cannot be safely cultivated. It should be kept in permanent vegetation. If sod is maintained and grazing controlled, it can be used for permanent pasture. This soil is in capability unit VIe–3. Included are some spots that are redder than the rest of this soil and about 17 acres that have more gravel on the surface.

Glenelg soils, 25 to 45 percent slopes, moderately eroded (GlE2).—These soils are channery in places. The texture is either silt loam or loam. These soils are too steep to be cultivated safely but can be used for pasture or kept in some type of permanent vegetation. They are in capability unit VIe–3. Included are some soils that are deeper and some that are redder.

Glenelg soils, 25 to 45 percent slopes, severely eroded (GlE3).—This unit includes all of the severely eroded, steep soils in the Glenelg series. It should not be cultivated or used for pasture. It is in capability unit VIIe–3.

Glenville series

The Glenville series consists of moderately well drained soils that have distinct fragipans, or siltpans, in the subsoil. These soils developed primarily from materials weathered from mica schist, phyllite, and, in some places, gneiss. The surface soil, however, consists mostly of fine materials washed from the higher lying Manor, Chester, Glenelg, and other associated soils. The Glenville soils occur on upland flats and in somewhat depressed areas throughout the Piedmont Plateau, generally around the heads and upper courses of intermittent drainageways.

Profile of Glenville silt loam, 0 to 3 percent slopes, in a forested area about three-fourths of a mile east of Beantown between Rockville and Avery:

Surface soil—

A_{00} 1 to 0 inch, loose litter of mixed hardwood leaves.

A_1 0 to 1 inch, very dark gray (10YR 3/1) silt loam; moderate, fine, granular structure; loose; many fine tree roots; strongly acid; abrupt, smooth boundary.

A_2 1 to 5 inches, olive-brown (2.5Y 4/4) silt loam; weak, medium, subangular blocky structure; friable when moist; many fine roots; very strongly acid; abrupt, smooth boundary.

Subsoil—

B_1 5 to 15 inches, yellowish-brown (10YR 5/6), heavy silt loam; weak to moderate, medium and coarse, subangular blocky structure; friable when moist; many fine roots in upper part, fewer below; very strongly acid; clear, smooth boundary.

B_{2mg1} 15 to 22 inches, yellowish-brown (10YR 5/6), heavy silt loam; common, fine, prominent mottles of dark brown (7.5YR 4/4) and light yellowish brown (2.5Y 6/4); compound structure—weak, medium, platy and weak, subangular blocky; firm and brittle when moist; very strongly acid; gradual, smooth boundary.

B_{2mg2} 22 to 28 inches, light yellowish-brown (10YR 6/4) silt loam; many, medium, distinct mottles of dark brown (7.5YR 4/4); compound structure—strong, medium, platy and strong, fine, subangular blocky; firm and brittle when moist; very strongly acid; abrupt, smooth boundary.

B_{3g} 28 to 42 inches +, silt loam; medium, distinct mottles of strong brown (7.5YR 5/6), pale olive (5Y 6/3), and black; weak, coarse, subangular blocky structure; friable when moist; a few discontinuous clayskins; micaceous; very strongly acid.

The forest consisted of hickory, gum, maple, and oak. In many places the A horizon is much thicker than that in the representative profile because of the accumulation of fine material in the surface. In some areas the textural difference between the A and B horizons is greater and the B horizon is silty clay loam. In places there is some quartzite gravel.

The Glenville soils are slowly permeable because of the fragipan in the subsoil. At times the surface soil is wet,

and at other times it is very dry because moisture cannot rise easily from the lower level. Some depressed spots are temporarily ponded after heavy rains or quick thaws.

These soils are quite extensive in the county but occur in small, widely scattered areas. They generally are not used for crops but are mostly in pasture.

Glenville silt loam, 0 to 3 percent slopes (GmA).—The profile of this soil is like that described as representative of the series. This soil can be cultivated safely if artificially drained in wet seasons. Most of it is in pasture. Because wetness is a more serious limiting factor than the hazard of erosion, this soil is in capability unit IIw–1.

Glenville silt loam, 3 to 8 percent slopes (GmB).—This soil is susceptible to erosion, but wetness is the major problem. It is in capability unit IIw–1.

Glenville silt loam, 3 to 8 percent slopes, moderately eroded (GmB2).—Runoff has caused some damage to this soil. The hazard of erosion is the major problem, but there is some need for drainage. This soil is in capability unit IIIe–13. Included are about 16 acres that have slopes of more than 8 percent.

Gravel pit

In several areas, particularly on the fringe of the Coastal Plain near the Prince Georges County line, there are deposits of waterworn cherty gravel. These deposits are of considerable economic importance. They are mostly in areas once occupied by the Croom and Chillum soils. The gravel is used principally for road material but can be used for other purposes.

Gravel pit (Gp).—These areas are in capability unit VIIIs–3. Unless given very special treatment, they are of no use in agriculture. Some possible uses are discussed under capability unit VIIIs–3.

Gullied land

This mapping unit is not a soil but a network of large and small, deep and very deep gullies. It is unsuitable for crops or pasture.

Gullied land, Penn materials (Gr).—The only areas of gullied land that are large enough to map are in the western part of the county. The gullies are in red shale and sandstone materials. Originally, these areas probably were occupied by Penn silt loam and Penn shaly loam.

These areas should be revegetated to protect streams from silt and adjacent lands from excess runoff. Almost any type of vegetation would serve this purpose. If forests can be reestablished, some economic return from timber is possible. These areas are in capability unit VIIe–3.

Huntington series

The Huntington series consists of deep, well-drained soils on flood plains. These soils developed from fine materials washed from soils that originated from limestone. They are on the same flood plains as the moderately well drained Lindside soils and the poorly drained Melvin soils, both of which developed from the same kind or a similar kind of material.

Profile of Huntington silt loam, 0 to 3 percent slopes, in a cultivated area one-fourth of a mile north of Whites Ferry:

Surface soil—

1_p. 0 to 2 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, granular structure; loose; roots abundant; many pores and worm channels; slightly acid; abrupt, smooth boundary.

2_p. 2 to 5 inches, dark-brown (7.5YR 3/2) silt loam; very weak, thick, platy structure; somewhat firm; roots plentiful; slightly acid; abrupt, smooth boundary.

Subsoil—

3. 5 to 12 inches, dark-brown (7.5YR 3/2) silt loam; moderate, coarse, subangular blocky structure; fine roots common; a few weak siltcoats; slightly acid to neutral; gradual, smooth boundary. Originally, the 2_p horizon probably was part of this horizon.

4. 12 to 60 inches +, brown (10YR 4/3) silt loam; medium, blocky and subangular blocky structure; friable; a few fine roots throughout; a few weak, grayish siltcoats; slightly acid to neutral.

In some areas, the surface soil is somewhat more gray than that in the representative profile and the subsoil is slightly more reddish brown. In places, especially at great depths, the subsoil is mildly to moderately alkaline. Where the soils grade to the somewhat less well drained Lindside soils, mottling occurs at depths of 30 to 36 inches.

The Huntington soils are fairly extensive and are among the most fertile and productive in the county. They are well suited to most crops grown in the area but are somewhat limited in use by the hazard of flooding. They are not flooded every year, but they are on the flood plains of the Potomac River and are susceptible to flooding after heavy rains or in times of high water.

Huntington silt loam, 0 to 3 percent slopes (HcA).—The profile of this soil is like that described as representative of the series. This is the most extensive of the Huntington soils. It is limited in use only by the hazard of flooding. It is in capability unit I–6.

Huntington silt loam, 3 to 8 percent slopes, moderately eroded (HcB2).—This soil is susceptible to further erosion, so it is in capability unit IIe–6. Included are about 40 acres that have slopes of slightly more than 8 percent.

Iredell series

The Iredell series consists of moderately well drained soils that developed from materials weathered from diabase, gabbro, diorite, and, in some places, serpentine. These soils have a very heavy, mottled, almost impervious clay subsoil. They occur on gently sloping to rolling uplands of the Piedmont Plateau. They are generally near the better drained Montalto and Legore soils and the poorly drained Watchung soils, which developed from the same kind or a similar kind of material.

Profile of Iredell silt loam, 0 to 3 percent slopes, in a second-growth forest of oak and redcedar on White Grounds Road 1½ miles south of Boyds:

Surface soil—

A_1 0 to 2 inches, very dark gray (10YR 3/1) silt loam; moderate, fine, crumb structure; friable when moist; roots abundant; medium acid; abrupt, smooth boundary.

A_2 2 to 8 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure; friable to somewhat firm when moist; many fine roots; medium acid; abrupt, smooth boundary.

Subsoil—

B_1 8 to 10 inches, dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable when moist; roots fairly few; medium to strongly acid; clear, smooth boundary.

B_{21} 10 to 20 inches, dark yellowish-brown (10YR 3/4) clay; strong, medium, blocky structure; firm when moist; very sticky and very plastic when wet; few roots; continuous, thin, light brownish-gray (10YR 6/2) clayskins; slightly acid; clear, smooth boundary.

B_{22g} 20 to 25 inches, dark yellowish-brown (10YR 3/4) clay; common, fine, faint mottles of yellowish brown (10YR 5/6); strong, medium, blocky structure; firm when moist and very plastic and extremely sticky when wet; continuous, light brownish-gray (10YR 6/2) clayskins; neutral; clear to abrupt, smooth boundary.

B_{3g} 25 to 28 inches, evenly and finely mottled, dark yellowish-brown (10YR 3/4) and yellowish-brown (10YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable when moist and plastic and sticky when wet; neutral; abrupt, smooth boundary.

Substratum—

C 28 to 36 inches +, strongly weathered diabase; loose and gritty; mildly alkaline.

In some areas the profile is deeper than the representative profile, but in others it is shallower and the surface soil is darker gray. Some stones of diabase are on the surface or in the soil.

The Iredell soils are mostly moderately well drained but are wet for considerable periods because of the very slowly permeable subsoil. Nevertheless, they have rather low moisture-supplying capacity. The fine texture makes plowing and other farm operations difficult. It also creates difficulties in areas where sewage disposal is by septic tank.

These soils are not extensive and are little used for agriculture. Much of the acreage is in forest, but the trees are mostly scrubs. Cedar and Virginia pine are dominant in cutover areas.

Iredell silt loam, 0 to 3 percent slopes (IdA).—The profile of this soil is like the representative profile described. Because of wetness and an almost impervious subsoil, this soil is in capability unit IVw–3.

Iredell silt loam, 3 to 8 percent slopes, moderately eroded (IdB2).—Runoff on this soil is increased by the very slow percolation of water through the subsoil. Erosion is a hazard but is not a severe one, because most areas are not cleared. This soil is in capability unit IVw–3.

Iredell silty clay loam, 3 to 15 percent slopes, severely eroded (IeC3).—This soil has lost most of its original surface soil and part of its subsoil through erosion. There are some gullies. This soil is in capability unit IVe–41.

Lakeland series

The Lakeland series consists of somewhat excessively drained, deep, very sandy soils that developed from coastal-plain sands. These sands are probably old alluvial outwash that has been reworked by wind into dune-like formations. Except for color, these soils show very little real subsoil development; they are but slightly modified sandy deposits.

Profile of Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded, in an idle area just off Brooklyn Bridge Road, about three-tenths of a mile north of its intersection with Montgomery Road and about a mile east of Burtonsville:

Surface soil—

A_p 0 to 16 inches, dark grayish-brown (10YR 4/2) loamy sand; structureless; soft when dry and loose when moist; roots plentiful; strongly acid; clear, smooth boundary.

A_2 16 to 34 inches, olive-yellow (2.5Y 6/6) loose sand; structureless; grains are clean, not coated with silt or clay; very strongly acid; clear, wavy boundary.

Substratum—

C_1 34 to 42 inches, yellowish-brown (10YR 5/4) loose sand; structureless; grains are very nearly clean and have only traces of clay coatings or stains; very few roots; very strongly acid; diffuse, irregular boundary.

C_2 42 to 56 inches, yellowish-brown (10YR 5/6), slightly loamy sand; loose to very friable; no apparent structure; very few roots; sand grains have very slight clay coatings or stains; contains some thin, irregular lenses and streaks of slightly more clayey material; very strongly acid; clear, irregular boundary.

C_3 56 to 60 inches +, very pale brown (10YR 7/4) sand; loose; structureless; very strongly acid.

The vegetation is mostly scattered saplings of Virginia pine.

In places, particularly where the soils are eroded, the A_p and A_2 horizons are much thinner than those in the representative profile. The depth to the C horizon ranges from about 34 inches to more than 60 inches. In spots where these soils grade to the Rumford soils, the texture of the C horizon is finer than that described. Normally, there is a very small amount of fine, worn, quartz gravel in the soil; the largest amounts are in the lower part of the subsoil.

Besides being very sandy, the Lakeland soils are droughty and are low in natural fertility. They are not productive except under the most intensive management to conserve moisture, build up and maintain fertility, and control wind and water erosion.

These soils are very limited in extent and occur in small areas in the eastern part of the county, from near Fairland to just east of Burtonsville.

Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded (LaC2).—The profile of this soil is like that described as representative of the series. Part of the erosion on this light, loose soil has probably been caused by wind. Even if protected from further erosion, this soil would not be productive. It is low in natural fertility and very low in moisture-supplying capacity. If used for crops, it needs careful management to increase fertility and to conserve moisture. It is in capability unit IIIs–1.

Lakeland loamy sand, 15 to 25 percent slopes, severely eroded (LaD3).—All of the original surface soil has been washed or blown from this soil, and deep gullies are fairly common. This soil is low in fertility and in moisture-supplying capacity. It is in capability unit VIIs–1.

Legore series

The Legore series consists of rather shallow to moderately deep, well-drained soils that developed from materials weathered from dark-colored basic rocks, including diabase, gabbro, diorite, and, in places, some serpentine. These soils have a fine-textured subsoil and are much less acid than most soils of the area. They occur mostly

on long, narrow, but sharply sloping dikes within the Piedmont Plateau. They are generally near the deeper, well drained Montalto soils, the moderately well drained Iredell soils, and the poorly drained Watchung soils, all of which developed from the same kind or a similar kind of material.

Profile of Legore silt loam, 3 to 8 percent slopes, moderately eroded, about 2 miles southwest of Boyds in a second-growth forest:

Surface soil—
- A_{00} 2 to ¼ inch, loose litter, mostly hardwood leaves but including some of redcedar.
- A_0 ¼ to 0 inch, decomposed organic matter.
- A_1 0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable when moist; roots abundant; medium acid; clear, smooth boundary.
- A_2 2 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable when moist; roots plentiful; medium acid; indistinct, wavy boundary.

Subsoil—
- B_1 6 to 12 inches, brown (10YR 4/3), heavy silt loam; weak, coarse, subangular blocky structure; friable to firm when moist; roots fairly common; medium acid; gradual, wavy boundary.
- B_2 12 to 20 inches, dark-brown (7.5YR 4/4), slightly gritty clay; moderate, medium, blocky structure; friable to firm when moist; very few roots; some clayskins of dark yellowish brown (10YR 3/4); slightly acid; clear, wavy boundary.

Substratum—
- C 20 to 36 inches +, variegated yellow, yellowish-brown, and gray, highly weathered, soft diabase; neutral.

In some areas the subsoil is redder than that in the representative profile, and in places the depth to the substratum is a little more than 20 inches. There are scattered fragments of diabase on or in the soil in some places, and a few large stones.

The Legore soils are used for hay, pasture, and other general crops. They are productive but are generally difficult to work because of fine texture and many, short, steep slopes.

These soils are extensive. They occur on dikes throughout the county, but mostly west of Boyds and Rockville.

Legore silt loam, 3 to 8 percent slopes, moderately eroded (LeB2).—The profile of this soil is like that described as representative of the series. This soil is the most easily managed of the Legore soils. Because of the slope, it is susceptible to further erosion. It is in capability unit IIe–10.

Legore silt loam, 3 to 8 percent slopes, severely eroded (LeB3).—This soil has lost most of the original surface soil through erosion, and in many places the subsoil is exposed. This soil can be cultivated, however, if special precautions are taken to check further erosion. It is in capability unit IIIe–10.

Legore silt loam, 8 to 15 percent slopes, moderately eroded (LeC2).—Cultivation of this soil is hazardous unless special care is taken to control erosion. This soil is in capability unit IIIe–10.

Legore silt loam, 8 to 15 percent slopes, severely eroded (LeC3).—This soil should be cultivated only infrequently. A vegetative cover should be kept on it most of the time. This soil is in capability unit IVe–10.

Legore silt loam, 15 to 25 percent slopes, severely eroded (LeD3).—This steep soil is in capability unit VIe–3. Included are a few acres that are not so severely eroded and about 7 acres that have slopes of more than 25 percent.

Leonardtown series

The Leonardtown series consists of somewhat poorly drained soils that have a compact layer in the subsoil. These soils developed from a silty mantle that was deposited on part of the Coastal Plain. They commonly occur near the Beltsville soils, which developed from thinner silty deposits. The Leonardtown soils are more poorly drained than the moderately well drained Beltsville soils and are more nearly level. These two series are similar in characteristics but differ greatly in use and management, mostly because of drainage.

Profile of Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded, in a cultivated area just west of Cherry Hill Road and two-tenths of a mile north of its intersection with Beltsville Road:

Surface soil—
- A_u 0 to 8 inches, olive (5Y 6/3) silt loam; strong, medium, crumb structure; friable when moist and plastic and slightly sticky when wet; roots plentiful; medium acid; abrupt, smooth boundary.

Subsoil—
- B_1 8 to 12 inches, brownish-yellow (10YR 6/6) silt loam; moderate, medium, subangular blocky structure; friable when moist and plastic and sticky when wet; roots fairly common; a few faint, gray coatings of silt; strongly acid; gradual, smooth boundary.
- B_{21g} 12 to 16 inches, brownish-yellow (10YR 6/6) silt loam; few, fine, faint mottles of light yellowish brown (2.5Y 6/4); strong, medium and coarse, subangular blocky structure; moderately firm when moist and plastic and sticky when wet; few roots; some gray coatings of silt; very strongly acid; abrupt, smooth boundary.
- B_{22mg} 16 to 23 inches, light yellowish-brown (2.5Y 6/4), light silty clay loam; common, medium to coarse, distinct mottles of yellowish brown (10YR 5/8); strong, thin to medium, platy structure; fairly dense; firm and brittle when moist and plastic and sticky when wet; no visible roots; contains many fragments of quartz gravel; strong, self-colored silt coatings between plates and on gravel surfaces; this is a tough, slowly permeable fragipan; very strongly acid; gradual, smooth boundary.
- B_{23mg} 23 to 29 inches, variable light brownish-gray and light-gray (2.5Y 6/2 and 7/2), light gravelly silty clay loam; common, medium and coarse, distinct mottles of yellowish brown (10YR 5/8); strong, medium, platy structure; very dense; very firm when moist and plastic and sticky when wet; no roots; strong gray coatings of silt between plates and on gravel fragments; very slowly permeable; similar to B_{22mg} horizon but grayer and more strongly acid; abrupt, smooth boundary.

Substratum—
- D 29 to 36 inches +, somewhat gravelly clay loam to clay; evenly, coarsely, and distinctly mottled with light gray (2.5Y 7/2) and yellowish brown (10YR 5/8); weak, thick, platy structure in upper part and massive in lower part; rather firm when moist and plastic and very sticky when wet; no roots; apparently this is a different deposit than the above horizon; very strongly acid.

The density and toughness of the fragipan vary considerably. The fragipan is less dense than that in the Beltsville soils but apparently is just as impermeable to water. The Leonardtown soils in the county are less uniform than the Beltsville soils.

Normally, the Leonardtown soils are poorly drained and fairly shallow to mottling, but those in Montgomery

County are only somewhat poorly drained and are unmottled to a depth of about 1 foot. These soils are wet for long periods but bake to a hard, bricklike consistence in hot, dry seasons. Runoff is high on the more strongly sloping areas.

These soils are of limited extent in the county and are not important agriculturally.

Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded (LgA2).—The profile of this soil is like that described as representative of the series. Wetness is more of a hazard than erosion. If properly drained, this soil is suited to most crops grown in the area. However, complete drainage would be difficult and expensive. The best use for this soil is pasture. It is in capability unit IVw–3.

Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded (LgB2).—The control of water on this soil is more of a problem than the control of erosion, so this soil is in capability unit IVw–3.

Lewisberry series

The Lewisberry series consists of shallow, sandy soils that have weak subsoil development. These soils developed from materials weathered from dark-red sandstone. They are on the uplands in the western part of the county near the well drained Penn and Bucks soils, the moderately well drained Readington soils, and the poorly drained Croton soils.

Profile of Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded, in a forested area just off Dawsonville Road (State Road 28) about 1½ miles south of Dickerson:

Surface soil—

A_1 0 to 2½ inches, very dark brown (7.5YR 2/2) sandy loam; weak, very fine, granular structure, in places weakly aggregated into medium, irregular blocks; loose; strongly acid; clear to abrupt, smooth boundary.

A_2 2½ to 7 inches, dark reddish-gray (5YR 4/2) sandy loam; compound structure—weak, medium, blocky and weak, fine, granular; friable when moist; strongly acid; clear, smooth boundary.

Subsoil—

B_2 7 to 19 inches, reddish-brown (2.5YR 4/4) coarse sandy loam; weak, medium and coarse, subangular blocky structure; friable when moist; porous; a few clayskins on casts and in pores; about 5 percent red sandstone gravel; strongly acid; gradual, irregular to broken boundary; horizon is 0 to 12 inches thick.

Substratum—

C 19 to 30 inches +, gravelly coarse sandy loam consisting of weathered and broken red sandstone that has some siltstone; firm in place, but can be cut with a spade; some mica flakes present; strongly acid.

The forest is mostly second-growth hickory and dogwood.

In some places the lower part of the surface soil is less gray and more brown than that in the representative profile and the subsoil is more weakly developed. In many places, particularly in cultivated eroded areas, the plow layer is directly over the substratum or is mixed with it. In some spots the soils have a deeper and somewhat better developed profile.

The Lewisberry soils in Montgomery County are excessively drained. Water passes rapidly through them, and their moisture-supplying capacity is low. They are fairly extensive in the county and, although not highly productive, are used rather widely for crops and pasture. Much of the acreage is still in forest.

Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded (LhA2).—The profile of this soil is like that described as representative of the series. All of this soil is eroded, even areas that are no longer cultivated but are in second-growth forest. It is in capability unit IIe–10.

Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded (LhB2).—This is the most extensive soil in the Lewisberry series. It is in capability unit IIe–10. Scattered throughout areas of this soil are about 218 acres of soil that is deeper and has a slightly finer textured subsoil.

Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded (LhB3).—The plow layer of this badly eroded soil is a mixture of the original surface soil and subsoil. In places the weathered sandstone parent material is mixed with the plow layer. Gullies are common to abundant, and some are fairly deep. If carefully managed and protected from further erosion, this soil can be cultivated safely in long rotations. It is in capability unit IIIe–10. Included are some scattered spots, totaling about 15 acres, that are somewhat deeper than this soil.

Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded (LhC2).—This soil needs to be carefully managed and protected from further erosion. It is in capability unit IIIe–10.

Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded (LhC3).—This soil can be cultivated infrequently if very carefully managed. It is in capability unit IVe–10.

Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded (LhD2).—This soil is mostly in forest, which has prevented serious erosion. It could be cultivated safely in long rotations if adequately protected from erosion. It is in capability unit IVe–10.

Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded (LhD3).—This soil has lost most of the original surface soil through erosion. There are many gullies, some of which have cut through the soil into the underlying material. This soil is not suited to cultivation. If a good sod is established, it can be used for pasture but should be carefully managed. Overgrazing should be avoided, especially in long dry periods. This soil is in capability unit VIe–3.

Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded (LhE3).—This soil is too steep to be cultivated or used for pasture. Forested areas should remain in trees. Other areas should be protected by trees or other vegetation. This soil is in capability unit VIIe–3.

Lindside series

The Lindside series consists of moderately well drained, bottom-land soils that developed from fine materials washed mainly from upland soils underlain by limestone. These materials were transported from areas farther up the Potomac River, outside of Montgomery County. The Lindside soils occur only on the flood plains of the Poto-

mac River and are near the well drained Huntington soils and the poorly drained Melvin soils, both of which developed from the same kind or a similar kind of material. Because of somewhat impeded drainage, the Lindside soils are mottled below depths of 18 to 22 inches.

Profile of Lindside silt loam, 0 to 3 percent slopes, in a cornfield about one-eighth of a mile north of Whites Ferry:

Surface soil—
- A_p 0 to 4 inches, dark yellowish-brown (10YR 3/4) silt loam; weak, fine, granular structure; friable when moist; slightly acid; abrupt, smooth boundary.

Substratum—
- C_1 4 to 18 inches, brown (10YR 4/3) silt loam; weak, medium and coarse, blocky structure; friable to somewhat firm when moist; slightly acid; gradual to clear, smooth boundary.
- C_{2g} 18 to 48 inches +, grayish-brown (10YR 5/2), heavy silt loam to silty clay loam; many, medium, distinct mottles of dark yellowish brown (10YR 4/4), dark brown (7.5YR 3/2), and black; moderate, medium, blocky structure becoming somewhat platy in lower part; firm when moist; about neutral.

In some places the texture is more uniform than that described. In places the C horizon is more strongly mottled and somewhat more grayish. In some areas a very fine textured, strongly mottled, very slowly permeable layer is within 40 inches of the surface.

The Lindside soils are wet for considerable periods. They are flooded nearly every year and in some years are flooded more than once. Although fairly fertile and productive, they are used mostly for pasture because they are too wet for general crops. Some late corn and other crops are grown.

Lindside silt loam, 0 to 3 percent slopes (LnA).—If drained, this soil is suited to all crops commonly grown in the area, as well as to pasture. Some allowance should be made for the hazard of flooding. This soil is in capability unit IIw–7. Included are a number of small areas that have slopes of somewhat more than 3 percent.

Linganore series

The Linganore series consists of shallow, well drained to excessively drained soils that have a thin, weak, textural B horizon and a fairly large amount of skeletal material in the profile. These soils developed from materials weathered from channery or slaty, dark-colored phyllitic schist. They are on resistant ridges on the uplands of the Piedmont Plateau and are associated mainly with the Urbana, Manor, and Glenelg soils.

Profile of Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded, just off Old Baltimore Road, about 1 mile west of Slidell in a cutover forest of mixed oaks:

Surface soil—
- A_{00} 3 to 1 inch, loose litter of oak leaves.
- A_0 1 to 0 inch, decomposed leaf mold.
- A_1 0 to ½ inch, very dark gray (10YR 3/1) channery silt loam; moderate, medium, crumb structure; friable when moist; roots abundant; about 20 percent fine channery phyllite; strongly acid; abrupt, smooth boundary.
- A_2 ½ to 6 inches, dark grayish-brown (10YR 4/2), heavy channery silt loam; weak, fine, subangular blocky structure; friable when moist; roots plentiful; about 20 percent fine channery phyllite; very strongly acid; diffuse, smooth boundary; horizon is 5 to 7 inches thick.

Subsoil—
- B_2 6 to 20 inches, dark-brown (7.5YR 4/4) channery silty clay; moderate, medium, subangular blocky structure; somewhat firm when moist and sticky when wet; some roots; about 20 percent channery phyllite; very strongly acid; gradual, irregular boundary; horizon is 6 to 16 inches thick.

Substratum—
- C 20 to 24 inches, variegated dark-brown (7.5YR 4/4) and very dark gray (N 3/0) mixture of 50 to 70 percent weathered phyllite in a matrix of silty clay; a few dark yellowish-brown (10YR 4/6) spots and streaks; inherited laminated or platy structure; very firm when moist but can be cut with a spade; gradual, irregular boundary; horizon is 2 to 18 inches thick.
- D_r 24 inches +, dark bluish-gray, purplish, and greenish, hard, unweathered phyllite.

In areas that are cultivated and uneroded, the surface soil is gun-metal gray when moist and steely gray when dry. In areas that are cultivated and eroded, it has a brownish cast, and, in most such areas, the A_p horizon is directly over the substratum and there is little if any subsoil. The depth to the substratum in uneroded areas ranges from 10 to 22 inches; in eroded areas it is much less, and in places bedrock is exposed.

The Linganore soils are acid, shallow, and droughty. Although not very productive, they are extensive in the county and are used commonly for general crops or pasture. The steeper areas are in forest.

Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded (LoB2).—The profile of this soil is like that described as representative of the series. This soil is thin and droughty and is easily damaged by erosion. It is in capability unit IIIs–7.

Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded (LoC2).—This soil can be cultivated safely under about the same management as Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded. It also is in capability unit IIIs–7.

Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded (LoD2).—This soil can be used for crops if cultivated only part of the time or to a limited extent. It is in capability unit IVe–10.

Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded (LrB3).—This soil has lost most of the original silty surface layer through erosion. The upper part of the subsoil is mixed with the plow layer. If carefully managed, this soil can be cultivated safely in a long rotation that includes a single clean-tilled crop. It is in capability unit IVe–10.

Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded (LrC3).—This soil has lost most of the original surface soil through erosion, and the plow layer is a mixture of the remaining surface soil and the upper part of the subsoil. It can be cultivated to a limited extent if carefully managed and protected from further erosion. It is in capability unit IVe–10.

Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded (LrD3).—This soil is so severely eroded that there is only a thin mantle of mixed material over bedrock. It is not suited to crops or pasture but should be revegetated to prevent further erosion and to provide wildlife habitats. If Virginia pines or other suitable trees could be planted or allowed to restock naturally, in time there might be some economic return. This soil is in capability unit VIIe–3.

Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded (LrE3).—This soil is too steep to be used for crops or pasture. It is in capability unit VIIe–3.

Made land

This land type consists of areas that have been so altered by industrial and building activities that they cannot be classified as soils. Included are railroad yards, airports, golf courses, and other areas from which the soils have been removed. Also included are ravines and depressions that have been filled with rock or soil debris.

Made land (Ma).—Because it is not used for agriculture, this land type is not in a capability unit. Some areas support vegetation that has no agricultural value. Many areas need conservation practices to control erosion, but they vary so much in characteristics that no general suggestions for their treatment can be made.

Manor series

The Manor series consists of rather shallow, somewhat excessively drained soils that have a weakly developed subsoil. These soils developed from materials weathered in place from rather hard slaty schist or soft micaceous schist. Some Manor soils contain a considerable amount of channery phyllite as skeletal material; others contain very little. These soils occur on the uplands of the Piedmont Plateau.

Profile of Manor channery silt loam, 3 to 8 percent slopes, moderately eroded, in a forested area just off Barnesville Road 1½ miles south of Comus:

Surface soil—

A_1 0 to ½ inch, very dark gray (10YR 3/1) channery silt loam.

A_2 ½ to 7 inches, brown (10YR 4/3) channery silt loam; weak, fine and medium, subangular blocky structure; friable when moist; roots abundant; about 30 percent fragments of hard phyllite; strongly acid; abrupt, smooth boundary.

Subsoil—

B_1 7 to 12 inches, brown (10YR 4/4) channery silt loam; moderate, medium, subangular blocky structure; friable when moist; roots abundant; some faint, self-colored clayskins; about 30 percent channery phyllite; very strongly acid; abrupt, smooth boundary.

B_2 12 to 18 inches, brown (7.5YR 4/4), light, very channery silty clay loam; weak, indeterminate, blocky structure, obscured by high content of skeletal material; friable to slightly firm when moist; distinct but discontinuous clayskins; about 50 percent channery phyllite; very strongly acid; abrupt, smooth boundary.

Substratum—

C 18 to 36 inches +, matrix (20 to 40 percent) of reddish-brown (5YR 5/3) silty clay loam that is 60 to 80 percent channery phyllite; fragments well coated with matrix material; firm to very firm when moist, but easily cut with a knife or spade; contains some fragments of gravel or, in places, stones of quartzite.

The forest is of oak and hickory and is about 75 years old. In cultivated, eroded areas, the plow layer is somewhat darker colored than that in the representative profile and generally rests directly on the substratum; little or no subsoil remains. Bedrock outcrops are common in places, and there are some quartzite stones. Where the subsoil is distinctly finer in texture than the surface soil, these soils grade toward the Glenelg soils. In places the subsoil is redder than that described; in others it is somewhat more yellow. In areas where the parent material was soft micaceous schist, the substratum is strongly weathered to depths of several feet and there are few, if any, hard schist fragments.

The Manor soils are shallow and tend to be droughty. They are not highly productive, but they occupy large areas and are used for all the common crops and for pasture.

Manor channery silt loam, 3 to 8 percent slopes, moderately eroded (McB2).—The profile of this soil is like that described as representative of the series. This soil should be carefully managed to prevent further erosion. It is in capability unit IIe–10. Included are about 20 acres that have slopes of slightly less than 3 percent.

Manor channery silt loam, 3 to 8 percent slopes, severely eroded (McB3).—This soil can be cultivated safely but needs special management to control erosion. It is in capability unit IIIe–10. Included are 3 acres that are severely eroded but have slopes of less than 3 percent.

Manor channery silt loam, 8 to 15 percent slopes, moderately eroded (McC2).—This soil is susceptible to further erosion and is in capability unit IIIe–10.

Manor channery silt loam, 8 to 15 percent slopes, severely eroded (McC3).—Because this soil is extensive, it is important to agriculture. In many areas, there is little or no subsoil between the plow layer and the substratum. The substratum, however, is mostly fragments and can be penetrated by roots to some depth. If precautions are taken to control erosion, this soil can be used for some crops in long rotations that provide a vegetative cover most of the time and include tilled crops infrequently. This soil is in capability unit IVe–10.

Manor channery silt loam, 15 to 25 percent slopes, moderately eroded (McD2).—The fairly steep slopes make erosion a serious hazard on this soil, so it is in capability unit IVe–10.

Manor channery silt loam, 15 to 25 percent slopes, severely eroded (McD3).—On this soil, erosion has removed most of the original soil and left a thin, dark-colored surface layer almost directly over the substratum. In many areas gullies are common, and some have cut deep into the substratum. This soil should be kept in permanent vegetation. If carefully managed and protected from overgrazing, it can be used for pasture. It is in capability unit VIe–3.

Manor channery silt loam, 25 to 45 percent slopes, moderately eroded (McE2).—This soil is not severely eroded, because most areas are in forest or have been carefully protected from erosion. Nevertheless, the hazard of erosion is great and this soil should not be cultivated. It can be used for pasture if carefully managed, but most forested areas should remain in forest. This soil is in capability unit VIe–3.

Manor channery silt loam, 25 to 45 percent slopes, severely eroded (McE3).—This soil is not suited to crops or pasture. It should be restocked with trees or allowed to revert naturally to forest. It is in capability unit VIIe–3.

Manor silt loam, 3 to 8 percent slopes, moderately eroded (MdB2).—The profile of this soil does not contain the high percentage of hard schist fragments that are common in the profile of Manor channery silt loam, 3 to

8 percent slopes, moderately eroded. This soil is in capability unit IIe–25. The hazard of erosion on this soil is serious. Included are many small areas, totaling about 53 acres, that have slopes of less than 3 percent.

Manor silt loam, 3 to 8 percent slopes, severely eroded (MdB3).—This soil is not strongly sloping, but erosion has cut deeply into the subsoil. Cultivation is hazardous, so the soil is in capability unit IIIe–25. Included are 3 acres where all of the surface and subsoil have been removed by erosion and the substratum is exposed.

Manor silt loam, 8 to 15 percent slopes, moderately eroded (MdC2).—This micaceous soil is easily eroded and needs constant protection to control erosion. It is in capability unit IIIe–25.

Manor silt loam, 8 to 15 percent slopes, severely eroded (MdC3).—If this soil is cultivated, it needs to be carefully managed and protected against further erosion. It is in capability unit IVe–25.

Manor silt loam, 15 to 25 percent slopes, moderately eroded (MdD2).—This soil is susceptible to further erosion. It can be cultivated safely only part of the time or to a limited extent. For this reason, it is in capability unit IVe–25.

Manor silt loam, 15 to 25 percent slopes, severely eroded (MdD3).—This soil cannot be cultivated safely but can be used for pasture if protected from further erosion. It is in capability unit VIe–3.

Manor silt loam, 25 to 45 percent slopes, moderately eroded (MdE2).—This soil is not severely eroded, partly because much of the acreage is still in forest. Its best use is forest, but if cleared it could be used for pasture. It is in capability unit VIe–3.

Manor soils, 8 to 15 percent slopes, very severely eroded (MeC4).—These soils are so severely eroded that only part of the parent material remains and bedrock is exposed in some places. They are not suitable for crops, but, if sod is established and grazing controlled, can be used to some extent for grazing. They are in capability unit VIe–3.

Manor soils, 15 to 25 percent slopes, very severely eroded (MeD4).—These soils are not suitable for crops or pasture. They are in capability unit VIIe–3.

Manor soils, 25 to 45 percent slopes, severely eroded (MeE3).—These soils are not suited to crops or pasture. They are in capability unit VIIe–3.

Manor soils, 45 to 65 percent slopes (MeF).—This unit includes all of the Manor soils in the county that have slopes of more than 45 percent. These soils cannot be used for crops or pasture and are in capability unit VIIe–3.

Melvin series

The Melvin series consists of poorly drained soils that occur only on the flood plains of the Potomac River. These soils developed from fine materials washed mainly from soils underlain by limestone or from limestone residuum. These materials were transported from areas outside the county. Because they are so poorly drained, these soils are mottled nearly to the surface. They are adjacent to the moderately well drained Lindside soils and the well drained Huntington soils but are at lower elevations and are flooded more frequently and for longer periods.

Profile of Melvin silt loam, 0 to 3 percent slopes, in a pasture one-fourth of a mile southwest of the intersection of River Road and Elmer School Road:

Surface soil—

A_{11} 0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, crumb structure; friable when moist; many fine roots; slightly acid; abrupt, smooth boundary.

A_{12} 2 to 8 inches, dark-brown (7.5YR 4/2) silt loam; some medium, faint mottles of brown (7.5YR 4/4); weak, fine, subangular blocky structure; friable when moist; many fine roots; slightly acid; abrupt, smooth boundary.

Subsoil—

B_{1g} 8 to 16 inches, dark grayish-brown (10YR 4/2) silt loam; many, medium, faint mottles of dark brown (7.5YR 4/2); moderate, coarse, blocky structure; friable when moist; a few roots; slightly acid to medium acid; gradual, smooth boundary.

B_{2g} 16 to 48 inches +, evenly, coarsely, and distinctly mottled brown and dark-brown (10YR 5/3 and 7.5YR 4/4) silty clay loam; moderate, fine to coarse, blocky structure, coarser with depth; friable to somewhat firm when moist; no roots; few, fine, black mottles; medium acid. Nature of substratum not determined.

Large areas of these soils are flooded frequently or are ponded after rains. In these areas, the soils normally are darker colored in the surface soil and are more strongly mottled.

Because they are so easily flooded, the Melvin soils are used mostly for grazing.

Melvin silt loam, 0 to 3 percent slopes (MgA).—If drained and protected from flooding, this soil would be suitable for cultivation. It is in capability unit IIIw–1.

Mixed alluvial land

This land consists of mixed soils that occur on alluvial flood plains, mostly in narrow strips along smaller streams. These soils vary greatly in depth, texture, drainage, permeability, content of gravel, and content of stones. They tend to be fine textured but are somewhat sandy in areas adjacent to Prince Georges County. Most of the acreage is poorly drained to somewhat poorly drained. Because of the many variations within short distances, these soils are not separated into types. They are generally low in fertility and, except for limited grazing, are not commonly used for agriculture.

Mixed alluvial land (Mh).—Most areas of Mixed alluvial land are level or nearly level, but there are some steeper areas along narrow draws. This land type is little used for agriculture and is in capability unit VIw–1.

Montalto series

The Montalto series consists of deep, well-drained soils that have a fine, slowly permeable subsoil. These soils developed from materials weathered from hard, dark-colored, igneous rocks, mostly diabase. They are strongly weathered and well developed and have good structure and intense red colors in the subsoil. They normally occur on narrow dikes, slightly above other soils on the uplands of the Piedmont Plateau.

Profile of Montalto silt loam, 3 to 8 percent slopes, moderately eroded, in a forest of poplar and hickory, 200 feet south of Whites Ferry Road and about 200 yards east of its intersection with Edwards Ferry Road:

Surface soil—
- A_{00} 2 to ¼ inch, hardwood leaves.
- A_0 ¼ to 0 inch, decomposed leaf mold.
- A_1 0 to 4 inches, dark reddish-brown (5YR 3/2) silt loam; weak, fine, crumb structure; friable when moist; roots abundant; many fine pores; neutral; abrupt, smooth boundary.
- A_2 4 to 12 inches, dark reddish-brown (2.5YR 3/4) silt loam; weak, coarse, subangular blocky structure; friable when moist; roots plentiful; many fine pores; slightly acid; gradual, smooth boundary.

Subsoil—
- B_1 12 to 15 inches, dark-red (2.5YR 3/6), heavy silt loam or silty clay loam; weak, medium, subangular blocky structure; friable when moist; roots fairly common; many fine pores; a few weak silt coatings; strongly acid; gradual, wavy boundary.
- B_{21} 15 to 23 inches, dark-red (10YR 3/6) silty clay loam; moderate, medium, subangular blocky structure; friable when moist; a few fine roots; thin, distinct clay coats; strongly acid; gradual, wavy boundary.
- B_{22} 23 to 42 inches, dark-red (10R 3/6) silty clay; strong, fine and medium, blocky structure; firm when moist; distinct, continuous, self-colored clayskins and some black, apparently manganic, coatings; few stones or boulders of diabase; strongly acid; gradual, wavy to irregular boundary.
- B_3 42 to 54 inches; red (2.5YR 4/8) silty clay loam variegated with strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; firm in place when moist but friable when removed; strong clayskins in root channels and on some surfaces and a few, black, manganic stains; contains some pockets or inclusions of horizon B_{22}; few stones or boulders of diabase; strongly acid; gradual, wavy to irregular boundary.

Substratum—
- C 54 to 72 inches +, strong-brown (7.5YR 5/8), gritty silt loam variegated with yellowish red (5YR 5/6) and with a few black specks; massive; consists of strongly weathered diabase that includes some stones and boulders; medium to slightly acid.

In some places, particularly where these soils grade to the Legore or Iredell soils, the subsoil is less red and normally much shallower. Some areas are stony to very stony and have many loose stones and boulders of diabase.

The Montalto soils have a slowly permeable subsoil but are well drained. They have a high moisture-supplying capacity. They are fairly productive and, where not too stony, are used for all crops commonly grown in the area. They occur mostly in small areas.

Montalto silt loam, 3 to 8 percent slopes, moderately eroded (MmB2).—The profile of this soil is like that described as representative of the series, except that the surface soil is generally a little less silty. This soil can be cultivated safely under fairly simple management to protect it from further erosion. It is in capability unit IIe–4.

Montalto silt loam, 8 to 15 percent slopes, moderately eroded (MmC2).—This soil is in capability unit IIIe–4. Included are about 21 acres that are more eroded and are indicated on the soil map by erosion symbols. A very small part of this more eroded soil has slopes of slightly less than 8 percent.

Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded (MnD2).—If this soil is cultivated, it should be carefully managed and protected from further erosion. It is in capability unit VIe–3.

Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded (MoC2).—About 40 to 90 percent of this soil is covered by stones, and there are large boulders in some places. This soil is not suitable for crops but can be used for grazing. It is in capability unit VIs–2. Included are about 3 acres that are severely eroded.

Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded (MoE2).—This soil is too steep and too stony to be used even for grazing. It should be kept in trees or other permanent vegetation that would provide protection for wildlife. It is in capability unit VIIs–2. Included are about 36 acres, shown on the soil map by rock outcrop symbols, that are severely eroded. An effort should be made to reestablish protective vegetation on these areas.

Neshaminy series

The Neshaminy series consists of deep, well-drained, strongly acid soils that developed from materials weathered from mixed rocks on the Piedmont Plateau. The rocks are gneiss, mica schist, and granitized schist. There are dikes, or sills, of diabase in some places and of a greenish rock called serpentine in others. Where diabase is included in the parent rock, the adjacent soils are commonly the Montalto, Legore, or Watchung soils. Where serpentine is included the adjacent soils are generally of the Iredell, Conowingo, Chrome, or Aldino series.

Profile of Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded, in a recently cleared area just off Old Brickyard Road 1½ miles southeast of its intersection with Falls Road:

Surface soil—
- A_p 0 to 5 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, granular structure; friable when moist; many fine roots; about 5 percent gravel, mainly quartzite; strongly acid; abrupt, smooth boundary.
- A_2 5 to 8 inches, yellowish-red (5YR 4/6) silt loam; weak, coarse, subangular blocky structure; friable when moist; few roots; about 5 percent gravel; strongly acid; abrupt, smooth boundary.

Subsoil—
- B_1 8 to 13 inches, yellowish-red (5YR 4/8), light silty clay loam; moderate, fine, subangular blocky structure; friable when moist; about 5 percent gravel; strongly acid; abrupt, smooth boundary.
- B_{21} 13 to 23 inches, red (2.5YR 4/8) silty clay loam; strong, fine and medium, blocky structure; friable when moist; continuous clayskins; about 5 percent gravel; strongly acid; abrupt, smooth boundary.
- B_{22} 23 to 35 inches, red (2.5YR 4/8) clay loam; strong, thick, platy structure; friable when moist; continuous clayskins; slowly permeable; about 10 percent gravel; strongly acid; abrupt, smooth boundary.
- B_3 35 to 48 inches, red (2.5YR 4/8) silty clay loam; moderate, fine, blocky structure; friable when moist; about 15 percent gravel; abrupt, smooth boundary.

Substratum—
- C 48 to 60 inches +, loose, weathered granitized mica schist; medium acid.

The structure of the B_{22} horizon is blocky or subangular blocky in places. In a few areas there are some mottles in the B_3 horizon. In areas dominated by diabase rock, the lower horizons are less strongly acid.

The Neshaminy soils are fairly extensive in the county and are important where they occur. They are used for all crops commonly grown in the area.

Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded (NeB2).—The profile of this soil is like that described as representative of the series. The hazard of

erosion is not great, so this soil is in capability unit IIe-4. Included are about 14 acres that have slopes of less than 3 percent.

Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded (NeC2).—Because of the strong slopes, this soil is susceptible to further erosion. It is in capability unit IIIe–4.

Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded (NsB3).—This soil has lost most of the original surface soil and, in places, some of the subsoil through erosion. The present surface soil is finer textured than the original. If cultivated, this soil needs careful management to control further erosion. It is in capability unit IIIe–4.

Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded (NsC3).—This soil can be cultivated safely only under intensive practices to control further erosion. It is in capability unit IVe–3.

Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded (NsD3).—Because of steep slopes and the hazard of further erosion, this soil is in capability unit VIe–3.

Penn series

The Penn series consists of shallow to moderately deep, well drained to somewhat excessively drained soils that developed from materials weathered from dark-red shale and sandstone. These soils are dark red to purplish red. The subsoil is only a little finer in texture than the surface soil. The Penn soils occur on the uplands of the Piedmont Plateau in the western part of the county, near the Bucks, Lewisberry, Readington, and Croton soils. Some Penn soils are mapped in a complex with Chillum soils.

Profile of Penn silt loam, 0 to 3 percent slopes, moderately eroded, in a forested area just south of Martinsburg:

Surface soil—
- A_{00} 2 to ¼ inch, loose litter of hardwood leaves.
- A_0 ¼ to 0 inch, decomposed leaf mold.
- A_1 0 to 1 inch, dusky-red (2.5YR 3/2) silt loam; moderate, fine, crumb structure; friable when moist; medium acid; abrupt, smooth boundary.
- A_2 1 to 5 inches, reddish-brown (2.5YR 4/4) silt loam; moderate, very fine, subangular blocky structure; friable when moist; very strongly acid; abrupt, smooth boundary.

Subsoil—
- B_2 5 to 16 inches, weak-red (10R 4/4), heavy silt loam; moderate, fine to medium, subangular blocky structure; friable when moist; distinct, continuous clay or silt coatings on faces and in root channels; very strongly acid; gradual, wavy boundary.

Substratum—
- C 16 to 28 inches, red (2.5YR 4/6), very shaly, heavy silt loam; very weak, coarse, subangular blocky structure; a very few coatings of clay or silt; very strongly acid; abrupt, irregular boundary.
- D_r 28 inches +, partially weathered, hard, red shale.

In severely eroded areas the plow layer rests directly on, and generally contains some of, the shaly parent material. In places the texture of the subsoil is a little finer than in the representative profile described. In uneroded areas the depth to the substratum ranges from 15 to 25 inches, but in eroded areas it is much less.

The Penn soils are well drained, except in shaly or eroded areas. These areas are somewhat excessively drained and are droughty when rainfall is low or unevenly distributed. The moisture-supplying capacity depends on the thickness of the subsoil and ranges from moderate to very low. These soils are not highly fertile but are productive if carefully managed to conserve moisture and improve fertility. They are extensive and are important to the agriculture of the county. They are used for general crops and for pasture.

Penn silt loam, 0 to 3 percent slopes, moderately eroded (PeA2).—The profile of this soil is like that described as representative of the series. Most areas of this soil are cultivated. In cultivated areas the upper part of the subsoil is mixed with the surface soil and the color is red to reddish brown. Because these areas are generally shallow, special practices are needed to keep them productive. This soil is in capability unit IIe–10.

Penn silt loam, 3 to 8 percent slopes, moderately eroded (PeB2).—This soil is like Penn silt loam, 0 to 3 percent slopes, moderately eroded, except that it has stronger slopes. It is in capability unit IIe–10. Included are 479 acres, mostly in forest, that are very slightly eroded.

Penn silt loam, 3 to 8 percent slopes, severely eroded (PeB3).—This soil has lost most of the original surface soil through erosion; consequently, the soil is shallow and its productivity is limited. Gullies are scattered to fairly common, and some are deep. To be cultivated safely, this soil needs intensive practices to control erosion. It is in capability unit IIIe–10. A small part of the acreage has slopes of slightly under 3 percent.

Penn silt loam, 8 to 15 percent slopes, moderately eroded (PeC2).—Because of the strong slopes, this soil is susceptible to further erosion. It is in capability unit IIIe–10. About a third of the acreage is very slightly eroded.

Penn silt loam, 8 to 15 percent slopes, severely eroded (PeC3).—If cultivated this soil needs very careful management to control erosion. It should be used only for long rotations that consist mostly of sod crops or for temporary or special crops. It is in capability unit IVe–10.

Penn silt loam, 8 to 15 percent slopes, very severely eroded (PeC4).—This soil is so badly eroded that only a little soil is left over the shaly substratum. Gullies are common, and many are deep. If sod is established and maintained, this soil can be used for grazing. It is in capability unit VIe–3.

Penn silt loam, 15 to 25 percent slopes, moderately eroded (PeD2).—Strong slopes make cultivation of this soil hazardous. Because of this, it is in capability unit IVe–10. Included are a few scattered areas, totaling about 11 acres, of deeper soil, probably of the Bucks series.

Penn silt loam, 15 to 25 percent slopes, severely eroded (PeD3).—This soil is not suited to cultivation. If grazing is controlled it can be used for pasture under careful management. It is in capability unit VIe–3.

Penn silt loam, 25 to 45 percent slopes, moderately eroded (PeE2).—Cultivating this soil would cause further erosion, but some pastures could be developed. This soil is in capability unit VIe–3.

Penn soils, 45 to 65 percent slopes (PsF).—Most areas of these soils are silt loam. About 11 acres are very stony, a few areas are very shaly, and some spots have a fine-

textured tough subsoil. These soils are not suited to crops or pasture. They are in capability unit VIIe–3.

Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded (PvC2).—About 30 to 80 percent of this soil is covered with stones. Rock, mostly sandstone, outcrops in many places, and there are some shaly ledges. Cultivation is not practical, but this soil can be used to some extent for grazing. It is in capability unit VIs–2.

Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded (PvE2).—This soil is susceptible to severe erosion if used even for grazing. It is mostly in forest and should remain in forest. It is in capability unit VIIs–2.

Readington series

The Readington series consists of gently sloping, moderately well drained soils that developed from red shale in the western part of the county. These soils have a very fine subsoil and a platy, dense fragipan in the lower part of the subsoil. They are on upland flats, normally surrounded by the Penn or Lewisberry soils.

Profile of Readington silt loam, 0 to 3 percent slopes, in a forested area just off River Road about 2 miles west of Seneca:

Surface soil—
- A_{00} 2 to 0 inch, litter of mixed hardwood leaves.
- A_1 0 to 3 inches, very dark gray (10YR 3/1) silt loam; very weak, thin, platy structure; somewhat loose; roots abundant; strongly acid; abrupt, smooth boundary.
- A_2 3 to 6 inches, brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable when moist; roots plentiful; very strongly acid; abrupt, smooth boundary.

Subsoil—
- B_1 6 to 14 inches, brown (7.5YR 4/4) silty clay loam; weak, medium, subangular blocky structure; friable when moist; roots fairly plentiful; weak coatings of silt in pores and root channels; very strongly acid; abrupt, smooth boundary.
- B_{21} 14 to 20 inches, strong-brown (7.5YR 5/6) silty clay loam that has some slight variegations toward reddish yellow (7.5YR 6/6); moderate, medium, subangular blocky structure; hard when dry and friable when moist; some fine roots; weak, discontinuous clayskins; very strongly acid; gradual, smooth boundary.
- B_{22m} 20 to 30 inches, yellowish-red (5YR 4/8 and 5/8) silty clay loam that is evenly, coarsely, and faintly mottled; moderate, medium, platy structure; hard when dry and firm and brittle when moist; a few fine roots; thin, continuous coatings of clay or silt; this dense layer is the hardpan, or claypan, technically known as a fragipan; very strongly acid; abrupt, smooth boundary.

Substratum—
- C 30 to 36 inches +, strongly weathered red shale and some red sandstone.

The forest is mostly oak but includes considerable hickory and ash.

Because of the red substratum, the mottling in these soils generally is faint or somewhat obscure, but in some places it is more prominent than in the representative profile. In many places the upper part of the subsoil is somewhat more red. In some areas these soils are a little deeper to the substratum.

The Readington soils are fine textured and somewhat difficult to work. They are easily eroded, even on moderate slopes. In addition, the dense fragipan slows the internal movement of water, which causes the surface soil to remain wet part of the time. In spring the soils are so wet and cold that seeding of some crops, such as corn, is delayed. In some areas considerable late silage corn is grown. These soils are fairly extensive in the county and are used for a wide variety of crops.

Readington silt loam, 0 to 3 percent slopes (ReA).—The profile of this soil is like that described as representative of the series. This soil is wet for considerable periods because water penetrates slowly and runs off slowly. Wetness is more of a problem than erosion, so this soil is in capability unit IIw–11.

Readington silt loam, 0 to 3 percent slopes, moderately eroded (ReA2).—Water runs off this soil rapidly enough to produce erosion. Although part of the surface soil has been removed by erosion, wetness is the major problem. This soil is in capability unit IIw–11.

Readington silt loam, 3 to 8 percent slopes, moderately eroded (ReB2).—On this soil erosion is much more of a problem than wetness. This soil is in capability unit IIIe–13.

Roanoke series

The Roanoke series consists of poorly drained soils that developed from material deposited by water on stream terraces on the Piedmont Plateau. Most of the parent material was derived from mica schist but some was derived from gneiss and other crystalline rocks. On the same terraces are the well-drained Wickham soils.

Profile of Roanoke silt loam, 0 to 8 percent slopes, in a forest of oak and hickory, on a terrace of Northwest Branch about one-fourth of a mile east of Layhill-Norwood Road:

Surface soil—
- A_{00} 2 to ½ inch, litter of mixed hardwood leaves.
- A_0 ½ to 0 inch, matted roots and decomposed organic matter.
- A_1 0 to 1 inch, very dark grayish-brown (2.5Y 3/2) silt loam; weak, fine, granular structure; loose; fine roots abundant; strongly acid; abrupt, smooth boundary.
- A_{2g} 1 to 9 inches, light brownish-gray (2.5Y 6/2) silt loam; common, medium, prominent mottles of dark reddish brown (5YR 3/3) and black; weak, thin, platy structure; roots plentiful; very strongly acid; abrupt, smooth boundary.

Subsoil—
- B_{21g} 9 to 13 inches, light olive-gray (5Y 6/2) silty clay loam; common, coarse, prominent mottles of strong brown (7.5YR 5/6); strong, medium, blocky structure; friable when moist; few roots; continuous gray (5Y 6/1) coatings of silt; very strongly acid; gradual, smooth boundary.
- B_{22g} 13 to 28 inches, light olive-gray (5Y 6/2) silty clay; strong, coarse, blocky structure that has a tendency toward horizontal cleavage or weak platiness; firm when moist; continuous light-gray or brownish-gray (2.5Y 6/2) silt coatings; very strongly acid; abrupt, smooth boundary.

Substratum—
- C_g 28 to 36 inches +, dark-gray (5Y 4/1) gravelly sandy clay; few, fine, distinct mottles of light olive brown (2.5Y 5/4); firm when moist; gravel consists of waterworn quartz and quartzite; very strongly acid.

The horizons vary in thickness above the substratum; in some areas they are thinner than described, and in others they are thicker. In some areas the soils are more strongly mottled. In some small local spots the soils appear to have developed partly from limestone sediments. These spots are too small to be shown on the soil map.

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The Roanoke soils are too poorly drained to be cultivated. Some areas are used for pasture, but most are in forest. Only one Roanoke soil is mapped in the county, and it is of limited extent.

Roanoke silt loam, 0 to 8 percent slopes (RkA).—The profile of this soil is like the representative profile described. This soil is not suited to crops and is in capability unit Vw–2.

Rock land

For the most part, Rock land occurs on the rocky islands in the Potomac River near Great Falls. It is the part of the rocky escarpment of the Piedmont Plateau that slopes to the Coastal Plain.

Rock land (Rn).—These areas are mostly barren rock and are of no use for agriculture, not even for forest. However, they are used for recreational purposes and have some value as wildlife habitats. Quarries have been developed in some areas. This land is in capability unit VIIIs–2.

Rowland series

The Rowland series consists of moderately well drained soils on the flood plains of small streams in the western part of the county. These soils developed from fine materials washed from soils underlain by red shale and sandstone. On the same flood plains are the well drained Bermudian soils and the poorly drained Bowmansville soils.

Profile of Rowland silt loam, 0 to 8 percent slopes, in a forest of birch, maple, and poplar, on the flood plain of Horsepen Branch, 200 feet south of River Road and about one-fourth of a mile west of the intersection of River Road and Willard Road:

Surface soil—

A_{00} 1 to 0 inch, loose litter of hardwood leaves.

A_1 0 to 4 inches, dark reddish-brown (2.5YR 3/4) silt loam; very weak, fine, subangular blocky and blocky structure; friable when moist; roots abundant; strongly acid; abrupt, smooth boundary.

Substratum—

C_1 4 to 16 inches, reddish-brown (2.5YR 4/4) silt loam; weak, medium, blocky structure; friable when moist; roots plentiful in upper 2 inches, fewer below; very strongly acid; abrupt, smooth boundary.

C_{2g} 16 to 28 inches, reddish-brown (2.5YR 4/4) and brown (7.5YR 5/2) silt loam, evenly mottled and has a few black specks; moderate, medium, subangular blocky structure; friable when moist; very strongly acid; abrupt, smooth boundary.

C_{3gm} 28 to 36 inches +, reddish-brown (2.5YR 4/4 and 5YR 5/3) silt loam, evenly mottled; moderate, medium, platy structure; hard when dry and friable to somewhat firm and brittle when moist; very strongly acid; grades at greater depth to a gravelly substratum.

The depth to mottling ranges from 12 to 30 inches but in most areas is between 24 and 30 inches. In places the texture of the C horizon is finer than described and is almost a silty clay loam. In places the lower part of the C horizon contains thin lenses of stratified sand.

The Rowland soils are rather wet for considerable periods. Water percolates slowly through them, and the water table rises seasonally to a depth of 30 inches. Flooding is common in spring.

Only one Rowland soil is mapped in the county. It is not extensive and occurs in small, scattered areas that are used mostly for pasture.

Rowland silt loam, 0 to 8 percent slopes (RoA).—If this soil is protected from flooding and drained of excess water in wet seasons, it can be used for most crops grown in the area. It is in capability unit IIw–7.

Rumford series

The Rumford series consists of deep, well drained to somewhat excessively drained, very sandy soils that developed from strongly weathered and leached sandy material on the Coastal Plain in the eastern part of the county. These soils have a thick, leached surface soil, a rather thin, weakly developed subsoil, and a deep, loose, sandy substratum. They occur on dunelike formations, generally near the Lakeland soils and in some places near the Sassafras soils.

Profile of Rumford loamy sand, 3 to 8 percent slopes, moderately eroded, on Brooklyn Bridge Road half a mile north of its intersection with Montgomery Road and about 1 mile east of Burtonsville:

Surface soil—

A_p 0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand or loamy fine sand; very weak, fine, crumb structure; loose to very friable, nonplastic and nonsticky; roots abundant; strongly acid; clear, smooth boundary; horizon is 6 to 8 inches thick.

A_2 7 to 17 inches, yellowish-brown (10YR 5/4), very light loamy fine sand; structureless (single grain); loose; roots plentiful in upper part, fewer below; very strongly acid; clear, wavy boundary; horizon is 8 to 14 inches thick.

Subsoil—

B_1 17 to 25 inches, yellowish-brown (10YR 5/6) loamy fine sand that has distinctly more silt and clay than the A_2 horizon; structureless (single grain); loose; few roots; contains a few thin lenses and isolated clay balls of material apparently identical to that of B_2 horizon; very strongly acid; clear, smooth to wavy boundary; horizon is 6 to 10 inches thick.

B_2 25 to 34 inches, brown (7.5YR 4/6) fine sandy loam; very weak, fine and medium, subangular blocky structure; very friable when moist, nonplastic and nonsticky; very few roots; contains pockets of material apparently identical to that of B_1 horizon; very strongly acid; abrupt, wavy boundary; horizon is 5 to 10 inches thick.

Substratum—

C 34 to 48 inches +, yellow (10YR 7/6) fine sand; structureless; loose; in upper part, a few lenses of material identical to that of B_2 horizon; no roots; very strongly acid.

Only one Rumford soil is mapped in the county. It is transitional between the Lakeland and the Sassafras soils. Where the A horizon is thinner than that described, the B horizon normally is thicker and in places is slightly finer textured. In other places the A horizon is thicker and the B horizon is thinner or coarser in texture, or both. In some places the sandy substratum is yellowish red. In others it is very pale brown to almost white.

The Rumford soil is droughty. It is not productive and is little used for agriculture. Most areas are idle or in residential development.

Rumford loamy sand, 3 to 8 percent slopes, moderately eroded (RsB2).—The profile of this soil is like that described as representative of the series. Erosion is caused mostly by wind, and areas that are idle should be protected by vegetation. Under intensive management to improve fertility and conserve moisture, this soil could be used for most crops. It is in capability unit IIIs–1.

Sassafras series

The Sassafras series consists of deep, well-drained, moderately coarse textured to medium textured soils that developed from old outwash material and probably some silty material deposited by wind. These soils are underlain by sands and clayey sands that grade at some depth to waterworn gravel. They are in the eastern part of the county on the Coastal Plain and generally are associated with the Chillum, Beltsville, and Rumford soils.

Profile of Sassafras loam, 3 to 8 percent slopes, moderately eroded, in a forest of oak, maple, dogwood, and hickory, on the horticultural farm of the University of Maryland on Cherry Hill Road:

Surface soil—

A_{00} 2 to ½ inch, loose hardwood leaves.

A_0 ½ to 0 inch, very thin layer of fibrous organic matter; lacking in many places.

A_1 0 to ½ inch, very dark gray (N 3/0) loam; moderate, fine and medium, crumb structure; very friable when moist; very uneven in thickness, filling vertical cracks and large root channels to a depth of about 2 inches; strongly acid; abrupt, irregular boundary.

A_{21} ½ to 3 inches, yellowish-brown (10YR 5/4), heavy loam to light silt loam; moderate, medium, granular structure; very friable when moist; roots abundant; very porous; wormholes abundant; strongly acid; diffuse, smooth boundary.

A_{22} 3 to 7 inches, yellowish-brown (10YR 5/4), heavy loam to light silt loam; moderate, medium, subangular blocky structure; friable when moist; roots abundant; porous; a few rounded gravel fragments; strongly acid; clear, smooth boundary.

Subsoil—

B_1 7 to 13 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium and coarse, subangular blocky structure; friable when removed moist, but firm in place; roots fairly plentiful; moderately porous; strongly acid; clear, smooth boundary.

B_{21} 13 to 23 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate to strong, medium and coarse, subangular blocky structure; slightly firmer than B_1 horizon but friable when removed moist; roots rather few; some worm channels; very strongly acid; gradual, smooth boundary.

B_{22} 23 to 30 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, coarse, blocky structure; firm in place, friable when removed moist; some fine roots; no worm channels; abundant clayskins; very strongly acid; very abrupt, smooth boundary.

Substratum—

D_1 30 to 40 inches, variegated yellowish-brown and dark-brown (10YR 5/6 and 4/3), gritty sandy clay loam; dark yellowish brown (10YR 4/4) when crushed; moderate, medium and coarse, subangular blocky structure; slightly cemented; firm when moist and very hard when dry; many cracks that have clayskins on surfaces; very strongly acid; gradual, wavy boundary.

D_2 40 to 50 inches, strong-brown (7.5YR 5/6), gritty sandy clay loam, that grades with depth to loose coarse sand; very weak, coarse, blocky structure; a few thin clayskins; very strongly acid; gradual, wavy boundary.

D_3 50 to 66 inches, dark-brown (7.5YR 4/4), slightly clayey coarse sand; loose; structureless.

D_4 66 to 72 inches +, brownish-yellow (10YR 6/4), coarse sand that grades to coarse, waterworn gravel.

The Sassafras soils in Montgomery County generally have a somewhat coarser texture than the representative profile; the A horizon is commonly light loam to sandy loam, and the B_2 horizon is commonly sandy clay loam. Where the substratum is more strongly cemented, as it commonly is in this county, these soils are somewhat like the Chillum soils. Locally, the substratum is more clayey than that described.

The Sassafras soils are deep, well drained, and moderately high in moisture-supplying capacity. Under good management they are fairly productive. Although of minor extent, they are important where they occur.

Sassafras loam, 3 to 8 percent slopes, moderately eroded (SaB2).—The profile of this soil is like that described as representative of the series, except that in places the surface soil is silt loam. Because much of the original surface soil has been removed by erosion, this soil is in capability unit IIe–4.

Sassafras loam, 8 to 15 percent slopes, moderately eroded (SaC2).—This soil has lost much of its original surface soil through erosion. It is in capability unit IIIe–4. Included are a few small spots where the surface soil is silt loam and one small area that is somewhat gravelly.

Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded (SfB2).—The substratum of this soil is massive sandy clay that is tough and in places slightly cemented. This soil occurs around draws and in upland depressions. It probably developed from material that gravitated to these slightly depressed areas. It is in capability unit IIe–4.

Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded (SsB2).—The profile of this soil is like that described in the representative profile, except that it is sandy to the depth of the plow layer. Because of sandiness and the hazard of further erosion, this soil is in capability unit IIe–5.

Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded (SsC2).—Because of the hazard of further erosion, this soil is in capability unit IIIe–5.

Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded (SsE2).—This soil needs intensive practices to control further erosion. It is in capability unit IVe–3.

Stony land

Throughout the Piedmont Plateau in Montgomery County, there are areas so stony that they cannot be designated as soils. The stony material in these areas is mainly unweathered stones and boulders of hard mica schist and stones of quartzite. The schist is the same kind as that from which the parent material of the Manor soils was derived.

Stony land, Manor materials, 3 to 15 percent slopes (StC).—Because of stoniness, this land type is not suited to cultivation, but it could be used for pasture. It is in capability unit VIs–2. Much of the acreage, particularly the palisades along the Potomac River, has been used for residential development.

Stony land, Manor materials, 15 to 45 percent slopes (StE).—Because of steepness and the severe hazard of erosion, this land type is not suited to crops or pasture but should be kept in woodland. It is in capability unit VIIs–2.

Urbana series

The Urbana series consists of moderately well drained upland soils that developed on the Piedmont Plateau from materials weathered from a hard schistose rock called actinolite. This rock is slaty. It is grayish, greenish, bluish, or purplish in color; where slightly weath-

ered, it is gun-metal gray in color and is soft and silky to the touch. These soils have a fairly fine textured subsoil, the lower part of which is a rather compact, dense, platy layer, or fragipan. They normally are in the same areas as the Linganore soils, which are much better drained and shallow and have no fragipan.

Profile of Urbana silt loam, 0 to 3 percent slopes, in an idle area about 200 yards east of Urbana Pike and 1 mile north of Clarksburg:

Surface soil—
- A_p 0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable when moist; fine roots plentiful; contains some fragments of bluish-gray phyllite; strongly acid; abrupt, smooth boundary.

Subsoil—
- B_{21} 8 to 15 inches, brown (7.5YR 4/4), light silty clay loam; moderate, fine, subangular blocky structure; friable when moist; few roots; some dark grayish-brown (10YR 4/2) coatings of silt; strongly acid; abrupt, smooth boundary.
- B_{22m} 15 to 20 inches, dark grayish-brown (2.5Y 4/2) silty clay loam; abundant, fine, prominent mottles of reddish brown (5YR 4/4); compound structure—moderate, medium, platy and moderate to strong, fine, subangular blocky; moderately firm and brittle when moist; about 25 percent partially weathered channers of actinolite; very strongly acid; gradual, irregular boundary.

Substratum—
- C 20 to 36 inches +, reddish-brown (5YR 4/3) saprolite, or weathered material, of silt loam texture; abundant, hard, slaty fragments; grades at some depth to hard, unweathered rock.

The fragipan, or B_{22m} horizon, varies in thickness and in firmness. It ranges from weak to very strong when moist; in places it is so weak that it is apparent only when the soils are nearly dry. The profile is thinner in some places than that described and considerably thicker in others; the pan is more prominent where the profile is thicker.

Although the Urbana soils generally are not very steep, they tend to be shallow. They are wet part of the time and droughty in long dry periods. The fragipan slows the penetration of rainwater and keeps water from rising as the upper layers dry out. Much of the acreage is used for crops or pasture, but large areas are idle or in second-growth Virginia pine.

Urbana silt loam, 0 to 3 percent slopes (UbA).—This soil tends to be wet for long periods after heavy rains or quick thaws. As drainage is a greater problem than controlling erosion, this soil is in capability unit IIw–11.

Urbana silt loam, 3 to 8 percent slopes, moderately eroded (UbB2).—Water drains from this soil rather rapidly, and further erosion is more of a hazard than wetness. This soil is in capability unit IIIe–13. Included are 32 acres that are seriously eroded; these spots are indicated on the soil map by erosion symbols.

Urbana silt loam, 8 to 15 percent slopes, moderately eroded (UbC2).—Although wetness is a problem on this soil, the greater hazard is further erosion. This soil is in capability unit IIIe–13.

Urbana silt loam, 8 to 15 percent slopes, severely eroded (UbC3).—This soil has lost most of the original surface soil through sheet erosion. It is not suitable for cultivation except in long rotations that are mostly in sod or other close-growing vegetation. It is in capability unit IVe–41.

Watchung series

The Watchung series consists of poorly drained soils that have a very fine, almost impermeable subsoil and are underlain by dark-colored basic rocks, mainly diabase. These soils occur in depressions on the Piedmont Plateau, mostly around the heads of drains or adjacent to small drainageways. In these places the surface soil consists mostly of silty material that washed from adjacent, higher areas. These soils normally are near the Legore or Montalto soils, both of which also developed from diabase.

Profile of Watchung silt loam, 0 to 8 percent slopes, in a forested area just off White Grounds Road 1½ miles south of Boyds:

Surface soil—
- A_{00} 2 to 0 inch, loose litter of pine needles and hardwood leaves.
- A_1 0 to 6 inches, dark grayish-brown (2.5Y 4/2) silt loam; weak, fine, crumb structure; friable when moist; roots rather few; very strongly acid; abrupt, smooth boundary.

Subsoil—
- B_{21g} 6 to 12 inches, dark grayish-brown (10YR 4/2) silty clay loam; many, fine, faint mottles of dark yellowish brown (10YR 4/4); strong, fine, blocky structure; firm when moist and plastic and sticky when wet; a few roots; strongly acid; abrupt, smooth boundary.
- B_{22g} 12 to 24 inches, dark grayish-brown (10YR 4/2) clay; many, medium, faint mottles of dark yellowish brown (10YR 4/4); strong, medium, blocky structure; firm when moist and very plastic when wet; a few fine roots; medium acid; abrupt, smooth boundary.
- B_{3g} 24 to 28 inches, dark grayish-brown (10YR 4/2) clay to gritty clay; strong, medium, blocky structure; firm when moist and very plastic and very sticky when wet; about 5 percent coarse fragments of yellowish, weathered diabase; slightly acid to neutral; abrupt, smooth boundary.

Substratum—
- C 28 to 36 inches +, strongly weathered, friable diabase that has some coarse, hard fragments.

The forest is mainly hickory and dogwood but includes some Virginia pine.

In some places, particularly in those where silty material washed from adjacent areas has been deposited, the surface soil is thicker than that described. In places the texture of the surface soil is silty clay loam.

The Watchung soils normally are too wet and too difficult to manage to be used for crops, but some areas are in pasture. Forested areas should remain in forest.

Only one Watchung soil is mapped in the county.

Watchung silt loam, 0 to 8 percent slopes (WcB).—This soil is not suited to crops. It is in capability unit Vw–2.

Wehadkee series

The Wehadkee series consists of poorly drained soils on first bottoms, or flood plains, on the Piedmont Plateau. The soils from which the materials washed, mainly Glenelg, Manor, and Chester soils, are underlain by acid, crystalline rocks. The Wehadkee soils are strongly mottled and have a high water table for a considerable part of the year. On the same flood plains are the moderately well drained Chewacla soils and the well drained Congaree soils, both of which developed from a similar kind of material.

Profile of Wehadkee silt loam, 0 to 3 percent slopes, in a pasture just south of Unity Road about 100 yards east of the bridge over Hawlings Creek:

Surface soil—
- A_{11} 0 to 2 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct mottles of yellowish red (5YR 4/6); weak, fine, granular structure; friable when moist; roots abundant; strongly acid; clear, smooth boundary.
- A_{12g} 2 to 6 inches, grayish-brown (2.5Y 5/2) silt loam; common, fine, prominent mottles of yellowish red (5YR 4/6); weak, thin, platy structure; friable when moist; roots plentiful in upper 2 inches; strongly acid; clear, smooth boundary.

Subsoil—
- B_{1g} 6 to 18 inches, brown (10YR 4/3) silt loam; many, fine and medium, distinct mottles of dark reddish brown (5YR 3/3); weak, thin, platy structure; friable when moist; few roots; very strongly acid; clear, smooth boundary.
- B_{2g} 18 to 24 inches, gray (10YR 6/1), light silty clay loam; many, medium, distinct mottles of brown and reddish yellow (7.5YR 4/4 and 6/6); weak, thin, platy structure; friable when moist; no visible roots; very strongly acid; gradual to clear, smooth boundary.

Substratum—
- G 24 to 48 inches +, gray (N 6/0) silty clay loam; many, coarse, distinct mottles of strong brown (7.5YR 5/8); compound structure—moderate, coarse, blocky and weak, thin, platy; firm when moist; no roots; very strongly acid; grades with depth to gravelly clay, silty clay, or sandy clay.

In places there is a thin overwash of sand on the surface or thin sandy lenses in the soil. The texture of the subsoil varies from silty clay loam to light silt loam.

The Wehadkee soils normally are too wet to be cultivated. Except for pasture, they are little used for agriculture. Only one Wehadkee soil is mapped in the county. It is very extensive and occupies more acreage than any of the other soils on the flood plains on the Piedmont Plateau.

Wehadkee silt loam, 0 to 3 percent slopes (WhA).—Because of wetness and poor drainage, this soil is in capability unit VIw–1.

Wickham series

The Wickham series consists of deep, well-drained, red soils that developed from materials deposited by water on stream terraces on the Piedmont Plateau. These materials originated from crystalline rocks, mostly gneiss and schist. On the same terraces are the poorly drained Roanoke soils.

Profile of a Wickham silt loam in a forest of second-growth pine just off U. S. Highway No. 29 about half a mile west of Snell Bridge:

Surface soil—
- A_{00} ½ to 0 inch, loose litter of pine needles.
- A_p 0 to 8 inches, dark-brown (7.5YR 4/4) silt loam; weak, fine, crumb structure; friable when moist; roots abundant; strongly acid; abrupt, wavy boundary.

Subsoil—
- B_{21} 8 to 14 inches, yellowish-red (5YR 4/8) silty clay loam; moderate, fine, subangular blocky structure; friable when moist; roots plentiful; very strongly acid; diffuse, wavy boundary.
- B_{22} 14 to 24 inches, red (2.5YR 4/8), heavy silty clay loam; moderate to strong, fine, blocky and subangular blocky structure; friable when moist; many roots in uppermost 2 inches, fewer below; prominent, yellowish-red (5YR 4/8) clayskins; very strongly acid; gradual, wavy boundary.
- B_3 24 to 36 inches +, red (2.5YR 4/8), gravelly silty clay loam; moderate, medium, blocky structure; firm; discontinuous clayskins; very strongly acid; amount of rounded gravel increases with depth; grades at some depth to a highly gravelly, pervious substratum.

These soils vary greatly in depth to the gravelly substratum. In many places, the gravel is at depths of 4 feet or more.

The Wickham soils are moderately high in moisture-supplying capacity and are productive under good management; but they occur in small, scattered areas and, therefore, are not important agriculturally.

Wickham silt loam, 0 to 3 percent slopes (WkA).—The profile of this soil is like that described as representative of the series. This soil can be cultivated safely under ordinary good management. It is in capability unit I–4.

Wickham silt loam, 3 to 8 percent slopes, moderately eroded (WkB2).—This soil needs careful management to be cultivated safely. It is in capability unit IIe–4. Included are 10 acres that are more severely eroded; these spots are indicated on the soil map by outcrop symbols.

Wickham silt loam, 8 to 15 percent slopes, moderately eroded (WkC2).—Because of the strong slopes, this soil is susceptible to further erosion. It is in capability unit IIIe–4. Included are about 15 acres that have slopes of more than 15 percent.

Worsham series

The Worsham series consists of poorly drained soils that have a moderately fine textured, slowly permeable subsoil. They developed mainly from mica schist and gneiss. The surface soil consists mostly of silty material washed from adjacent, higher areas. These soils occur in depressions at the heads of drains and along small drainageways on the Piedmont Plateau. Nearly every draw and depression on the part of the plateau that is underlain by crystalline rocks is occupied by a small area of Worsham soil. The Glenelg, Chester, and Manor soils, all of which developed from mica schist, gneiss, or micaceous phyllite, generally occur nearby.

Profile of Worsham silt loam, 0 to 8 percent slopes, in a forest of tulip-poplar, pin oak, and maple, about 100 feet south of Claysville Road and three-fourths of a mile west of its intersection with Bowie Mill Road:

Surface soil—
- A_{00} 2 to 0 inch, loose litter of mixed hardwood leaves.
- A_{1g} 0 to 11 inches, dark grayish-brown (2.5YR 4/2) silt loam; few, fine, faint mottles of very dark yellowish brown (10YR 3/4); weak, medium, crumb structure; friable when moist; roots abundant; strongly acid; clear, smooth boundary.

Subsoil—
- B_{1g} 11 to 18 inches, light yellowish-brown (2.5Y 6/4) silty clay loam; many, medium, faint mottles of yellowish brown and dark yellowish brown (10YR 5/6 and 4/4); weak, thick, platy structure, probably stratified; firm in place but friable when removed moist; few roots; strongly to very strongly acid; gradual, smooth boundary.
- B_{21g} 18 to 31 inches, light olive-brown (2.5Y 5/4) silty clay loam; abundant, medium, prominent mottles of strong brown (7.5YR 5/8); strong, coarse, blocky structure in place, crushes readily to medium, moderate plates if removed; firm in place, friable if removed; prominent silt coatings of light olive gray (5Y 6/2) on vertical structural surfaces; no roots; very strongly acid; abrupt, smooth boundary.

B_{22mg} 31 to 50 inches, yellowish-brown (10YR 5/8), heavy silt loam; abundant, medium to coarse mottles of gray and strong brown (N 5/0 and 7.5YR 5/8); weak to moderate, thick, platy structure; firm and brittle when moist; no roots; some clayskins of strong brown (7.5YR 5/6) in vertical cracks and old root or worm channels; contains considerable finely divided mica; very strongly acid; clear to abrupt, smooth boundary.

Substratum—

C 50 to 60 inches +, friable, highly weathered mica schist.

Because these soils occur in pockets and depressions, they vary greatly in drainage. The soil in the lowest part of each area has the poorest drainage and is mottled almost to the surface. The soil near the edge of an area is better drained and is not mottled within several inches of the surface. Soils that are plowed generally do not have specks or mottles in the plow layer.

Only one Worsham soil is mapped in the county. It is extensive but generally occurs in small, scattered areas. Most cleared areas are in pasture or are idle. A few areas are used for hay, corn, or other crops.

Worsham silt loam, 0 to 8 percent slopes (WoA).—This soil is so wet that generally it is not used for crops. Artificial drainage would not be practical. This soil is in capability unit Vw–2. Included are 12 acres that have slopes of slightly more than 8 percent and 9 acres that are somewhat stony.

Use and Management of the Soils

This section has four major subsections. The first consists of an explanation of the capability classification of soils and suggestions for the management of the soils of the county, by capability units; the second provides estimates of yields of specified crops from each of the soils; the third discusses the use of the soils for forest; and the fourth is concerned with the suitability of the soils for highway construction and other engineering purposes.

Capability Groups of Soils

Capability grouping is a system of classification to show the relative suitability of soils for crops, pasture, forestry, or wildlife. It is a practical grouping based on the needs and limitations of the soils, the risk of damage to them, and their response to management. In this report, soils have been grouped on three levels above the soil mapping unit. They are the capability unit, the subclass, and the class.

The capability unit, which can also be called a management group of soils, is the lowest level at which soils are grouped to show their capability. A capability unit is a group of soils similar in management needs, in risk of damage, and in general suitability for use; or a single soil that is distinctive enough in those qualities to be in a group by itself.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" means that the main limiting factor is risk of erosion if the plant cover is not maintained. The symbol "w" means that excess water retards plant growth or interferes with cultivation. The symbol "s" means that the soils are shallow, stony, sandy, droughty, or low in fertility.

The broadest grouping, the class, is identified by Roman numerals. All of the soils in one class have limitations or hazards of about the same degree, but of different kinds as shown by the subclass. Any class except class I may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care. In Montgomery County, there is about 3,200 acres of class I soils.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping and consequently need moderate care to prevent erosion. Other soils in class II may be slightly droughty, slightly wet, somewhat limited in depth, or somewhat low in fertility. In Montgomery County, there is nearly 109,000 acres of class II soils. This is about 35 percent of the acreage of the county.

Class III soils can be cropped regularly, but they have a narrower range of use. Their limitations of erosion hazard, wetness, or droughtiness make more careful management necessary. Properly managed and conserved, they make good farmland; carelessly managed, they will deteriorate and go out of production. In Montgomery County, there is nearly 86,000 acres of class III soils. This is a little more than 27 percent of the acreage of the county.

In class IV are soils that should be cultivated only occasionally or only under very careful management. These are marginal soils, easily lost to production if mismanaged. Careful conservation is needed to keep them contributing to the agriculture of the county. In Montgomery County, there is almost 59,000 acres of class IV soils. This is about 18 percent of the acreage of the county.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops but can be used for pasture, for woodland, or for wildlife shelter.

Class V soils are nearly level and gently sloping, but they are wet, subject to damaging overflow, low in fertility, or otherwise unsuitable for cultivation. In Montgomery County, there is more than 14,000 acres of class V soils. This is about 5 percent of the acreage of the county.

Class VI soils generally are not suitable for cultivated crops because they are steep, droughty, wet, or otherwise limited. They are best suited to trees or pasture. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out, pastures can be seeded, or some special crops can be grown. There is about 36,500 acres of class VI soils in Montgomery County. This is about 12 percent of the acreage of the county.

Class VII soils have characteristics that severely limit their use for pasture and, in some places, for woodland. Yields of forest products may be fair to high. In Montgomery County, there is 7,000 acres of class VII soils.

In class VIII are soils that have practically no agricultural use. They may be of considerable use as recreational areas or protective areas for wildlife. There is 1,188 acres of class VIII soils in Montgomery County.

The soils of Montgomery County have been grouped into the following classes, subclasses, and units. The numbers of the units are not consecutive because they are part of a statewide system of capability grouping, not all units of which are represented in Montgomery County.

Class I.—Soils that have few limitations that restrict their use.
- Unit I–4.—Deep, well-drained, nearly level, upland soils.
- Unit I–6.—Nearly level, well-drained, silty soils on flood plains and low terraces.

Class II.—Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.

Subclass IIe.—Nearly level to gently sloping soils, subject to erosion if tilled.
- Unit IIe–1.—Deep, well-drained, nearly level to gently sloping soils that are influenced by lime and are moderately limited by the hazard of erosion.
- Unit IIe–4.—Deep, well-drained, nearly level to gently sloping soils that are not influenced by lime.
- Unit IIe–5.—Gently sloping, eroded, sandy soils that have a somewhat sandy subsoil.
- Unit IIe–6.—Gently sloping, well-drained, silty soils of the flood plains and low terraces.
- Unit IIe–7.—Gently sloping, gravelly and silty soils that have a dense, or compact, gravelly subsoil or substratum.
- Unit IIe–10.—Nearly level to sloping, well-drained soils that are somewhat shallow to moderately deep.
- Unit IIe–14.—Sloping, moderately eroded soils that have impeded drainage and are influenced by lime.
- Unit IIe–25.—Nearly level to gently sloping, moderately deep soils that are well drained to somewhat excessively drained.

Subclass IIw.—Moderately wet soils.
- Unit IIw–1.—Nearly level to sloping soils that have impeded drainage and are not influenced by lime.
- Unit IIw–2.—Nearly level soils that have impeded drainage and are influenced by lime.
- Unit IIw–7.—Nearly level to gently sloping, moderately well drained soils of the flood plains.
- Unit IIw–8.—Nearly level to gently sloping, eroded soils that have a very dense, compact subsoil that restricts drainage.
- Unit IIw–11.—Nearly level soils that have restricted drainage because of a very slowly permeable subsoil.

Class III.—Soils that have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Subclass IIIe.—Sloping soils that have high risk of erosion if tilled.
- Unit IIIe–4.—Deep, well-drained, gently sloping to rolling soils that are not influenced by lime and are moderately to severely eroded.
- Unit IIIe–5.—Rolling, sandy soils that have a somewhat sandy subsoil.
- Unit IIIe–7.—Rolling, gravelly and silty soils that have a dense, or compact, gravelly subsoil or substratum.
- Unit IIIe–10.—Shallow, gently sloping to rolling soils.
- Unit IIIe–13.—Eroded, gently sloping to strongly sloping soils that have a tight subsoil that restricts drainage.
- Unit IIIe–25.—Gently sloping to strongly sloping, moderately deep, eroded soils that are well drained to somewhat excessively drained.

Subclass IIIw.—Wet soils that require artificial drainage if tilled.
- Unit IIIw–1.—Poorly drained, flood-plain soils that are influenced by lime.

Subclass IIIs.—Soils that are severely limited by sandiness.
- Unit IIIs–1.—Gently sloping to strongly sloping, excessively drained, very sandy soils that have a very deep, very sandy subsoil.
- Unit IIIs–7.—Shallow, gently sloping to strongly sloping soils that tend to be droughty.

Class IV.—Soils that have very severe limitations that restrict the choice of plants, require very careful management, or both.

Subclass IVe.—Soils severely limited by risk of erosion if tilled.
- Unit IVe–3.—Deep, rolling to hilly, well-drained soils that are limited by the hazard of erosion.
- Unit IVe–7.—Hilly soils that have a dense, or compact, gravelly subsoil or substratum.
- Unit IVe–10.—Rolling to hilly and shallow to very shallow, eroded soils.
- Unit IVe–25.—Well-drained, rolling to hilly soils that are moderately deep.
- Unit IVe–41.—Severely eroded, shallow soils that have a tight subsoil.

Subclass IVw.—Soils severely limited for use as cropland because of excess water.
- Unit IVw–3.—Somewhat poorly drained to moderately well drained, silty soils that have a dense, compact subsoil.

Class V.—Soils that have little or no erosion hazard but have other limitations that are impractical to remove and that limit their use largely to pasture, woodland, or wildlife food and cover.

Subclass Vw.—Soils limited in use to grazing or woodland because of poor internal drainage.
- Unit Vw 2.—Poorly drained soils on flats and in depressions.

Class VI.—Soils that have severe limitations that make them generally unsuitable for cultivation and limit

their use largely to pasture, woodland, or wildlife food and cover.

Subclass VIe.—Soils moderately limited for pasture or trees by risk of erosion if cover is not maintained.

Unit VIe–2.—Steep, sandy and gravelly soils that are limited in use by the hazard of erosion.

Unit VIe–3.—Sloping, very severely eroded, shallow soils and steep, moderately eroded, shallow soils.

Subclass VIw.—Soils severely limited by poor drainage.

Unit VIw–1.—Poorly drained soils that are not influenced by lime and are subject to frequent flooding.

Subclass VIs.—Soils severely limited by stones and outcrops of rock.

Unit VIs–2.—Gently sloping to strongly sloping, well-drained soils that are very stony.

Class VII.—Soils that have very severe limitations that make them unsuitable for cultivation and that restrict their use largely to pasture, woodland, or wildlife shelter.

Subclass VIIe.—Soils restricted in use to woodland and grazing because of extreme hazard of erosion.

Unit VIIe–3.—Rolling to very steep soils that are commonly shallow and are severely limited by the hazard of erosion.

Subclass VIIs.—Soils severely limited by extreme sandiness or stoniness.

Unit VIIs–1.—Rolling, severely eroded, very sandy soils that have a deep, very sandy subsoil.

Unit VIIs–2.—Gently sloping to steep soils that are very stony.

Class VIII.—Soils and land types that are not suitable for cultivation and are restricted in use to recreation and wildlife habitats.

Subclass VIIIs.—Land restricted to nonagricultural uses because of poor physical characteristics.

Unit VIIIs–2.—Extremely rocky land and large expanses of barren rock.

Unit VIIIs–3.—Barren pits left after gravel has been removed.

In the following pages, each capability unit is described briefly, the soils in each are listed, and some suggestions for the use and management of those soils are given.

Capability unit I–4

This unit consists of deep, well-drained, nearly level soils that occupy small areas on flat ridgetops in the uplands. None of these soils have been significantly affected by erosion. The soils in this unit are—

Bucks silt loam, 0 to 3 percent slopes.
Chester silt loam, 0 to 3 percent slopes.
Elioak silt loam, 0 to 3 percent slopes.
Wickham silt loam, 0 to 3 percent slopes.

These soils occur throughout the Piedmont section of the county, but mostly in the eastern part. Their total area is only about 989 acres—about three-tenths of 1 percent of the area of the county.

These soils are used for all crops commonly grown in the county and for high-quality pasture. Most of the acreage has been cleared, and only a small part is in woodlots or forest.

A 3- or 4-year rotation is well suited to these soils, but the rotation can be extended to 5 years or more if alfalfa or some other close-growing crop is grown for 3 years or more. In the common 3-year rotation, corn is followed by winter wheat, barley, or—occasionally—oats, then 1 year of mixed hay, either red clover and timothy or ladino clover and orchardgrass. The mixture of red clover and timothy is the more common. It is turned under for green manure immediately before corn is planted.

These soils need fertilizer. They are not well supplied with any of the plant nutrients except potassium. They are acid and require careful liming.

Yields are high under present management and could be increased considerably by improved management.

Capability unit I–6

This unit consists of nearly level, well-drained, silty soils that occur on flood plains and on low terraces. These soils are flooded occasionally but not frequently. The soils in this unit are—

Ashton silt loam, 0 to 3 percent slopes.
Bermudian silt loam, 0 to 3 percent slopes.
Congaree silt loam, 0 to 3 percent slopes.
Huntington silt loam, 0 to 3 percent slopes.

These soils occur along streams and rivers in all parts of the county except the Coastal Plain. The largest areas are along Seneca Creek, Rock Creek, the Potomac River, and the Patuxent River below Brighton Dam. Small, narrow strips that lie along some of the smaller streams are used and managed like the adjacent soils. The total area of the soils is about 2,164 acres—about seven-tenths of 1 percent of the area of the county.

These soils are fertile and productive. They are deep and easily penetrated by roots. They are well supplied with plant nutrients, which occasionally are replenished naturally by flooding. The moisture-supplying capacity generally is adequate.

Hay and corn are the principal crops, but all crops common to the area are grown. The most common pasture plants are bluegrass and whiteclover.

Corn can be grown year after year, preferably with a cover crop between seasons. Following corn, soybeans can be grown for hay or, if combined with sorghum, for silage. Mixed hay can be grazed part of the time or, after a year or more as a hay crop, can be used for pasture. Small grains are not commonly grown because of the danger of flooding and lodging. However, excellent small grain crops are produced in good seasons.

Although naturally fertile, these soils should be limed and fertilized as indicated by soil tests, which are available through the county agent's office. Generally lime and fertilizer are used only on corn. Animal manure is especially valuable for corn.

Well-managed pastures on these soils have about the greatest carrying capacity, measured in cow-acre-days, of any pastures in the county, even though they are wet at times and flooded about once every 5 years. To prevent puddling or compacting of soils and trampling of forage plants, animals should not be allowed to graze

these pastures when the soils are wet. Weeds become a pest in pastures but can be controlled with special weed-killing chemicals or by proper fertilization and carefully regulated grazing. Mowing at regular intervals is especially effective in controlling weeds, and mowing machines can be used easily on these bottom-land soils.

Capability unit IIe-1

This unit consists of deep, well-drained, nearly level to gently sloping soils that are influenced by lime and are moderately limited by the hazard of erosion. The soils in this unit are—

Elk silt loam, 0 to 3 percent slopes, moderately eroded.
Elk silt loam, 3 to 8 percent slopes, moderately eroded.

These soils occur only on some of the older and higher terraces along the Potomac River. They occupy 356 acres —about one-tenth of 1 percent of the county.

The soils in this unit are fertile and highly productive. They are fairly easy to work and to manage. They are used mostly for corn, small grain, hay, and pasture. Corn and alfalfa are the principal crops. A mixture of sorghum and soybeans is extensively grown. Yields of all crops are high.

A 3- or 4-year rotation is common. Corn is usually followed by 2 or more years of alfalfa.

Lime and fertilizer should be applied as indicated by soil tests. Full use should be made of all manure and crop residues.

Management consists mainly of maintaining fertility and preventing further erosion. In places it is necessary to divert runoff into natural drainageways, which should be kept sodded. The outlets of these diversions need to be well prepared and carefully maintained to prevent the concentration of water from damaging the soil.

Capability unit IIe-4

This unit consists of deep, well-drained, nearly level to gently sloping soils that are not influenced by lime. Erosion is more of a hazard than on the soils in unit I–4. The soils in this unit are—

Bucks silt loam, 0 to 3 percent slopes, moderately eroded.
Bucks silt loam, 3 to 8 percent slopes, moderately eroded.
Chester silt loam, 0 to 3 percent slopes, moderately eroded.
Chester silt loam, 3 to 8 percent slopes, moderately eroded.
Elioak silt loam, 3 to 8 percent slopes, moderately eroded.
Montalto silt loam, 3 to 8 percent slopes, moderately eroded.
Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded.
Sassafras loam, 3 to 8 percent slopes, moderately eroded.
Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded.
Wickham silt loam, 3 to 8 percent slopes, moderately eroded.

These soils are scattered throughout the county but are most extensive in the eastern part of the Piedmont area. The total area is 16,112 acres—about 5 percent of the area of the county.

All of these soils are acid except where they have been limed. They are all at least moderately productive, and some, particularly the Chester and Montalto soils, are highly productive. They are fairly well supplied with plant nutrients and are easy to work and to conserve.

These soils are used mainly for dairying and general farming. They are used to a limited extent for orchards, nurseries, and truck gardens. They are suited to all crops grown in the county, including orchard crops, but much of the acreage is in pasture. Comparatively little acreage is in forest or woodlots. The pastures are generally well managed and have a high carrying capacity, but there are some overgrazed areas where yields are poor and erosion is active.

A 3-year rotation is common but a 5- or 6-year one might be better, especially if alfalfa is included. Mixtures of grass and clover are used for grazing. Much hay is produced. It consists of alfalfa, a mixture of alfalfa and tall grass, or timothy seeded with red clover. Sorghum is grown with soybeans for forage.

The most important management needs are to maintain fertility and to prevent further erosion. To control erosion, management should include contour tillage, stripcropping, careful disposal of excess water, and rotations that keep the soils in a vegetative cover much of the time. By good management, yields can be increased considerably. On a few of the better managed farms, yields are as much as 30 to 40 percent higher than average.

Capability unit IIe-5

This unit consists of a gently sloping, eroded, sandy soil that has a somewhat sandy subsoil. The only soil in this unit is Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded. It occurs in a narrow area on the Coastal Plain, adjacent to the Prince Georges County line. It totals only 155 acres, less than one-tenth of 1 percent of the county.

This soil is easy to work and to maintain. Although somewhat droughty, it is permeable and well suited to deep-rooted crops, which obtain much moisture from the subsoil or substratum. It is one of the better agricultural soils in a part of the county where the soils generally are low in natural fertility and productivity.

This soil is used for most crops common to the area and is especially desirable for home and truck gardens. It needs lime and large amounts of manure or other organic matter, as well as rather heavy applications of complete fertilizer. Fertilization should be based on the results of soil tests.

Conserving moisture and maintaining fertility are the main management problems. Tilling on the contour will encourage the percolation of water through the soil, and stripcropping on the contour will help to control erosion.

Capability unit IIe-6

In this unit are gently sloping, well-drained, silty soils of the flood plains and low terraces. These soils are similar to the soils in capability unit I–6 except that they are more strongly sloping and are susceptible to erosion. The soils in this unit are—

Ashton silt loam, 3 to 8 percent slopes, moderately eroded.
Bermudian silt loam, 3 to 8 percent slopes.
Huntington silt loam, 3 to 8 percent slopes, moderately eroded.

The total area is 363 acres, about one-tenth of 1 percent of the area of the county.

Although these soils are limited in extent, they are highly productive and are important where they occur. They are less apt to be flooded than the soils in capability unit I–6, and they have more rapid surface drainage.

These soils are suited to nearly all crops grown in the area, and they are excellent for pasture. They need the

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same kind of management as the soils in capability unit I–6 except that rotations should be longer and contour tillage and stripcropping should be used where feasible. Yields are likely to be somewhat lower than on the soils in capability unit I–6.

Capability unit IIe–7

The soils in this unit are underlain by deposits of waterworn gravel and have a very compact, more or less cemented layer in the substratum or the lower part of the subsoil. The soils in the unit are—

Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded.
Chillum silt loam, 3 to 8 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded.
Croom gravelly loam, 3 to 8 percent slopes, moderately eroded.

The total area is 3,327 acres—slightly more than 1 percent of the area of the county. Much of the acreage has been used for urban and suburban development. Some is in Takoma Park and Silver Spring, some extends northeastward along the Prince Georges County line almost to the Patuxent River, and some is in the western part of the county near Martinsburg.

These soils are not much used in agriculture. They are low in fertility and productivity. The soil above the compact layer is excessively wet at times but tends to dry out rapidly and does not have the mottling that is characteristic of an imperfectly drained soil. When dry the soils become very hard and are difficult to work. In places there is enough gravel to interfere with cultivation.

If these soils are used for crops, they need large amounts of fertilizer, manure, and crop residues. In addition, they should be carefully managed to prevent further erosion. Drains are needed to dispose of excess water. In excessively dry periods, irrigation would benefit crops, but first the soils should be improved in tilth and fertility and protected from further erosion. It has not been determined whether irrigation would be economical.

Capability unit IIe–10

In this unit are nearly level to sloping, well-drained soils that are somewhat shallow to moderately deep. These soils have lost much of the original surface soil through erosion. The soils in this unit are—

Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded.
Legore silt loam, 3 to 8 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded.
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.
Penn silt loam, 0 to 3 percent slopes, moderately eroded.
Penn silt loam, 3 to 8 percent slopes, moderately eroded.

These soils occur in the western and northwestern parts of the county. They occupy about 21,251 acres—slightly less than 7 percent of the area of the county.

The soils in this unit are somewhat droughty in long dry periods. Some, particularly the Lewisberry soils, are low in fertility. Most, however, are more fertile than the Lewisberry soils and are productive under good management.

These soils are suited to most crops grown in the area. Except for the Penn and Lewisberry soils, they are suited to orchard crops. In the western part of the county, where the Penn and Lewisberry soils are dominant, small general farms are most common. Where the soils are mostly of the Glenelg and Manor series, particularly near the Frederick County line, the farms are generally larger and are used mostly for dairying.

A 3-year rotation of corn, small grain, and hay is common. To protect the soil and maintain productivity, the rotation should be extended to 5 or 6 years by the addition of hay or other close-growing crop. In some places, particularly on the more shallow Lewisberry and Penn soils, hayfields tend to become sodbound, especially after the second year. Breaking up the sod after the first year generally results in better crops for the rest of the rotation.

Corn is commonly followed by alfalfa, which usually is seeded in midsummer. On the Penn and Lewisberry soils, alfalfa is kept on the soil for only 2 years; but on the Glenelg, Legore, and Manor soils, alfalfa is kept on the soil for 3 to 4 years. In another common rotation, corn is followed by a winter cover, then spring oats is followed by hay. If wheat or barley is in the rotation, it is seeded in fall, following corn.

These soils need intensive management to maintain fertility and to conserve moisture. Considerable amounts of fertilizer and adequate amounts of lime are needed. The soils should be tested to determine the amounts required. All available manure should be used, and all plant residues returned to the soil. Legumes and cover crops should be used wherever feasible. Contour tillage and stripcropping help to decrease runoff and control erosion. Water that collects, generally around the outlets of waterways, should be dispersed over sodded areas so that its movement will be slowed. This will permit more water to penetrate the soil and will also prevent the loss of soil material.

Capability unit IIe–14

This unit consists of one sloping, moderately eroded soil that has impeded drainage and is influenced by lime. This soil, Captina silt loam, 3 to 8 percent slopes, moderately eroded, developed from old alluvium. It totals about 181 acres—less than one-tenth of 1 percent of the area of the county.

This soil is moderately fertile and, if not too wet, is easily worked. It has, however, a tight subsoil that impedes the percolation of water, causes the surface soil to be wet part of the time, and increases runoff and erosion.

This soil is best suited to corn, hay, and pasture. Both hay and pasture stands should consist largely of clover, combined with tall grasses. Most of the native pastures are in bluegrass and whiteclover, but this mixture should not be seeded.

A common rotation consists of corn followed by wheat or barley and then by 1 or 2 years of mixed hay or 2 years of alfalfa. Because of its slowly permeable subsoil, this soil is less well suited to alfalfa than to other hay crops. It is well suited to sweet corn.

Growing legumes will help to maintain the nitrogen level. Fertilizer, particularly phosphate, is beneficial. Both fertilizer and lime should be applied according to the results of soil tests.

Although many areas are used with adjacent higher soils, this soil should be managed separately. The main problems are wetness and erosion. Diversion terraces will help to intercept runoff from higher areas and prevent the concentration of water. Ditches may be needed to divert water from the wettest spots. To prevent puddling or compacting, livestock should not be allowed to graze when the pastures are very wet.

Capability unit IIe-25

This unit consists of nearly level to gently sloping, moderately deep soils that are well drained to somewhat excessively drained. Most of these soils are moderately eroded. The soils in this unit are—

Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.
Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded.
Glenelg silt loam, 0 to 3 percent slopes.
Glenelg silt loam, 3 to 8 percent slopes, moderately eroded.
Manor silt loam, 3 to 8 percent slopes, moderately eroded.

These soils occur throughout the crystalline rock area of the county but mostly in the central and southeastern part of the Piedmont area. The total area is 49,268 acres—about 15 percent of the area of the county. The nearly level parts of the urban and suburban developments in the southern part of the county consist largely of soils of this unit.

The Edgemont soil is somewhat deeper than the other soils in this unit, and the Manor soil is somewhat shallower. All of the soils are acid. They are poorly to moderately well supplied with plant nutrients. They are easily eroded.

These soils are suitable for the crops commonly grown in the county and for peaches, grapes, berries, and other fruits. There are many dairies and a number of horse and pony farms. Some areas are farmed only part of the time by owners who are employed elsewhere.

A suitable rotation consists of corn followed by small grain then by 2 years of hay. On the nearly level areas that have less hazard of erosion, 1 year of hay is sufficient. If alfalfa is the hay crop, it should be grown for at least 3 years, particularly if no small grain is grown between the corn crop and the alfalfa crop.

Fertilizer and lime should be applied according to the results of soil tests. In addition, many legumes should be grown, particularly in hay and cover crops.

Erosion is the principal management problem. The soils should be kept in a vegetative cover much of the time. Runoff should be controlled by contour tillage and stripcropping. Excess water can be dispersed through sodded waterways that have adequate outlets. Fruit trees should be planted and cultivated on the contour, and the soil around them kept in sod or cover crops most of the time.

Capability unit IIw-1

This unit consists of nearly level to sloping soils that have impeded drainage and are not influenced by lime. The soils in this unit are—

Glenville silt loam, 0 to 3 percent slopes.
Glenville silt loam, 3 to 8 percent slopes.

Small tracts of these soils are scattered throughout the crystalline rock area. They do not occur in the western part of the county, where the bedrock is red shale and sandstone, nor in the coastal-plain area. They commonly occur at or near the heads of drains, where silt washed from higher areas has accumulated. The total area is 6,913 acres—more than 2 percent of the area of the county.

These soils are fairly low in fertility. They are wet for considerable periods because they have a tight subsoil that impedes drainage. They are used mostly for corn, hay, and pasture. Unless artificially drained, they are not suitable for alfalfa, which tends to winter-heave.

The most common cropping system consists of continuous corn or of corn followed by 1 year or more of hay. Small grains are not generally grown. Both hay and pasture stands should include water-tolerant species.

Fertilizer and lime are needed. The amounts needed can be determined by soil tests.

Wetness is a more serious management problem than erosion. Runoff from higher areas should be diverted. The wettest spots need ditches or tile drains to remove excess water. These soils should not be cultivated or grazed when very wet. Animals should be allowed to graze only when the soils are dry enough not to be puddled or compacted. This practice will permit the soils to rest for periods throughout the year and will help to maintain good pastures. Weeds and sedges should be controlled by mowing at proper intervals.

Capability unit IIw-2

This unit consists of one nearly level soil that has impeded drainage and is influenced by lime. This soil, Captina silt loam, 0 to 3 percent slopes, is similar to the soils in capability unit IIw-1 except that it originated from limestone.

This soil totals 609 acres—slightly less than two-tenths of 1 percent of the area of the county.

Because of its slowly permeable subsoil, this soil is wet for fairly long periods, but it is droughty and is very hard when dry. It is more fertile and productive than the soils in unit IIw-1 but can be managed in about the same way. It should produce higher yields and require less fertilizer and lime.

Capability unit IIw-7

In this unit are nearly level to gently sloping, moderately well drained soils of the flood plains. The soils in this unit are—

Chewacla silt loam, 0 to 3 percent slopes.
Lindside silt loam, 0 to 3 percent slopes.
Rowland silt loam, 0 to 8 percent slopes.

These soils occur along the Potomac River and in the areas underlain by red shale and sandstone in the western part of the county. They occupy about 5,967 acres—slightly less than 2 percent of the area of the county.

If drainage is improved the areas that are not frequently flooded can be used for crops. Some corn is

grown, but, unless the soils are artificially drained, it must be planted late in the season. Considerable hay is grown, but most of the acreage is in pasture. Many areas, particularly the smaller ones, are still in forest.

If drained and otherwise well managed, these soils are productive. Open V-type ditches will improve drainage. Runoff from higher areas should be diverted. The main drainageways should be kept clean, and some of the channels straightened and deepened.

Capability unit IIw-8

This unit consists of nearly level to gently sloping, eroded soils that have a very dense, compact subsoil that restricts drainage. The soils in this unit are—

Beltsville silt loam, 0 to 3 percent slopes, moderately eroded.
Beltsville silt loam, 3 to 8 percent slopes, moderately eroded.
Colluvial land.

These soils are on uplands and on colluvial deposits on the Coastal Plain. They total 1,893 acres—about six-tenths of 1 percent of the area of the county.

In wet periods, especially in winter and early in spring, these soils are saturated down to the hardpan but contain little water in the hardpan or below it. In most places the hardpan is so dense and tough that very little water and few roots can penetrate it. In addition, runoff is slow because these soils are nearly level to gently sloping.

The soils in this unit are used for most crops but mainly for corn and other silage crops and for hay crops, except alfalfa. They are also used for pasture. Because of the hardpan, alfalfa and other deep-rooted crops are not suitable. Alfalfa tends to winter-heave.

These soils are acid and should be limed according to the results of soil tests. Although rather low in fertility, they can be made productive by applying fertilizer and growing green-manure and cover crops.

Because of the dense subsoil, drainage and water control are the most important factors in managing these soils. Water that accumulates in slight depressions can be drained by surface ditches. Tile drains can be used where the hardpan is not too close to the surface. Ditches and other waterways must have sufficient grade to remove water but should not be so steep that the water will move rapidly enough to create gullies. Where practical, graded strips should be used on the more sloping soils.

Capability unit IIw-11

This unit consists of nearly level soils that have restricted drainage because of a very slowly permeable subsoil. The soils in the unit are—

Aldino silt loam, 0 to 3 percent slopes.
Conowingo silt loam, 0 to 3 percent slopes, moderately eroded.
Readington silt loam, 0 to 3 percent slopes.
Readington silt loam, 0 to 3 percent slopes, moderately eroded.
Urbana silt loam, 0 to 3 percent slopes.

The total area of these soils is 2,442 acres—almost 1 percent of the area of the county. The Readington silt loams occupy 2,182 acres.

These soils are wet and cold in spring, but by midsummer they dry out almost completely and become hard. The slow internal drainage not only impedes drainage but also, in dry weather, prevents soil moisture from moving toward the surface. Fertility is rather low, but if the soils are liberally fertilized and adequately drained, yields are fairly good. Many areas are idle that could be used for crops or pasture.

These soils are used mostly for hay and pasture. A little corn is grown, but it is difficult to get a good stand of corn because the soils are cold and wet in spring when corn should be planted. Late-planted corn germinates better but is more apt to be retarded by dry periods later in the season. The Conowingo soil is especially likely to dry out or bake in dry weather. If corn is planted, it is commonly followed by at least 2 or 3 years of hay, which may be grazed in the field. Clovers are common in all hay or pasture mixtures. Alfalfa is not suited to these soils, because it needs a deep root zone. It can be damaged either by excessive moisture or by lack of moisture, and it tends to winter-heave. Wheat and barley produce fair yields if the soils are well fertilized and drained.

These soils are low in plant nutrients, especially potassium. They need to be carefully fertilized and limed. Manure will add nutrients and also improve the physical condition of the soils.

Wetness is the most serious management problem. Many areas are so nearly level that ditches cannot be constructed with sufficient grade to be satisfactory. In many places tile drains do not function properly, because of the tight, fine-textured subsoil. Bedding of pastures in narrow strips would drain the surface but would leave very wet furrows. Pastures should be mowed to control weeds. To prevent puddling and compacting, machines and farm animals should be kept off these areas when the soils are wet.

Capability unit IIIe-4

This unit consists of deep, well-drained, gently sloping to rolling soils that are not influenced by lime and are moderately to severely eroded. The soils in this unit are—

Bucks silt loam, 3 to 8 percent slopes, severely eroded.
Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded.
Chester silt loam, 3 to 8 percent slopes, severely eroded.
Chester silt loam, 8 to 15 percent slopes, moderately eroded.
Elioak silt loam, 8 to 15 percent slopes, moderately eroded.
Elioak silty clay loam, 3 to 8 percent slopes, severely eroded.
Montalto silt loam, 8 to 15 percent slopes, moderately eroded.
Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded.
Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded.
Sassafras loam, 8 to 15 percent slopes, moderately eroded.
Wickham silt loam, 8 to 15 percent slopes, moderately eroded.

The total area of these soils is 2,317 acres—about eight-tenths of 1 percent of the county.

These soils are suitable for general farming and dairying. Corn, small grain, hay, and pasture are the principal crops. Yields are fairly good. Orchards are not common, but these soils would be well suited to them.

To keep these soils productive will require better management than they have had in the past. A 3-year rotation consisting of corn, small grain, and hay is common. Better protection for the soils would be provided by a 4- or 5-year rotation that includes 2 or 3 years of hay or pasture.

Capability unit IIIe–5

The only soil in this unit is Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded. It occupies only 105 acres—much less than one-tenth of 1 percent of the area of the county. Its subsoil, though finer textured than the surface soil, contains considerable sand.

This soil is low in fertility. It tends to dry out more quickly than finer textured soils. For short periods in midsummer, it is dry enough so that crops may be damaged.

A suitable rotation consists of corn followed by 2 to 4 years of hay. A small grain could be included. Fruit crops could be grown, and also early vegetables, particularly those that are harvested early, before the soil dries out in summer.

Fertilizer is necessary, and lime should be applied where needed. The amounts of fertilizer and lime required can be determined by soil tests.

This soil needs careful management to improve fertility, conserve water, and control erosion. Supplemental irrigation would make it possible to grow more crops.

Capability unit IIIe–7

This unit consists of rolling soils that have a dense, or compact, gravelly subsoil or substratum. The soils in this unit are—

Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded.
Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded.
Chillum silt loam, 8 to 15 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded.
Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded.
Croom gravelly loam, 8 to 15 percent slopes, moderately eroded.

The total area is 1,632 acres—one-half of 1 percent of the area of the county.

The soils in this unit are similar to those in capability unit IIe–7 but are more strongly sloping or more eroded. They are less productive because they have lost more soil, water, and plant nutrients through leaching and erosion.

These soils can be used for general crops but are better suited to pasture. Some of the less eroded areas are still in forest. Large areas, particularly those near suburban developments, are idle or are used for gravel pits.

If crops are grown on these soils, rotations should be longer than on the soils of unit IIe–7, contour strips should be more carefully established, more fertilizer should be applied, and more attention should be given to the disposal of excess water.

Capability unit IIIe–10

This unit consists of shallow, gently sloping to rolling soils. These soils are similar to the soils in capability unit IIe–10 except that they have stronger slopes or are more eroded. The soils in this unit are—

Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded.
Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded.
Legore silt loam, 3 to 8 percent slopes, severely eroded.
Legore silt loam, 8 to 15 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded.
Manor channery silt loam, 3 to 8 percent slopes, severely eroded.
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.
Penn silt loam, 3 to 8 percent slopes, severely eroded.
Penn silt loam, 8 to 15 percent slopes, moderately eroded.

The soils in this unit occur extensively in the western and northwestern parts of the county and, because of their extent, are very important to the agricultural economy. The total area is 25,155 acres—about 8 percent of the area of the county.

The soils in this unit are low in natural fertility and productivity. They are low in moisture-supplying capacity and tend to be droughty. Crops are damaged in long dry periods. The productivity could be considerably improved through careful management.

These soils are used for most crops grown in the county and for pasture. If adequately limed and fertilized, they are well suited to clover, mixed hay, bluegrass, or mixed pasture crops. All but the Lewisberry soils are suited to alfalfa, and all but the Penn and Lewisberry soils are well suited to orchards.

Rotations should be long and should include hay and other close-growing crops. A 4- or 5-year rotation should include 3 years or more of hay or pasture.

These soils need careful management. They should be tilled on the contour and cropped in fairly narrow strips. Terraces are needed in some places. So far as practicable, runoff should be diverted to the meadow strips so that most of it will be absorbed. Excess water should be channeled through protected waterways and outlets. Pastures should be well established before they are grazed, and grazing should be carefully regulated. Weeds can be controlled by mowing at regular intervals.

Capability unit IIIe–13

This unit consists of eroded, gently sloping to strongly sloping soils that have a tight subsoil that restricts drainage. Most of these soils are only moderately well drained, even though they are sloping. The soils in this unit are—

Aldino silt loam, 3 to 8 percent slopes, moderately eroded.
Aldino silt loam, 8 to 15 percent slopes, moderately eroded.
Beltsville silt loam, 8 to 15 percent slopes, moderately eroded.
Chrome silt loam, 8 to 15 percent slopes, moderately eroded.
Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded.
Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded.
Conowingo silt loam, 0 to 3 percent slopes, severely eroded.
Glenville silt loam, 3 to 8 percent slopes, moderately eroded.
Readington silt loam, 3 to 8 percent slopes, moderately eroded.
Urbana silt loam, 3 to 8 percent slopes, moderately eroded.
Urbana silt loam, 8 to 15 percent slopes, moderately eroded.

These soils occur throughout the county, mostly in small scattered areas. Some areas are in suburban developments. The total area is 9,404 acres—about 3 percent of the area of the county.

These soils are not very fertile or productive, but they can be cultivated and are important where they occur.

Most of the acreage is in mixed hay and pasture; in both, clover is dominant. Some corn is grown but very little small grain. Because of erosion and impeded drainage, these soils are poorly suited to vegetables or orchards. They are best suited to hay and pasture, but they are not productive unless fertilized. Fertilizer and lime should be applied according to the results of soil tests.

The soils in this unit vary considerably in steepness, drainage, fertility, and erosion. The most important management requirement is to prevent further erosion. Controlling erosion will also help to improve drainage. If practicable, runoff from higher areas should be diverted around these soils. If this is not possible, runoff can be directed to well-sodded drainageways. Very wet spots and some of the more nearly level areas can be drained, to some extent, by open V-type ditches that discharge into main drains. Tile generally is not effective, because in most places the surface soil is too shallow and the subsoil too fine textured and tight. Contour tillage and stripcropping will help to control runoff on the steeper areas. These soils should not be plowed except at long intervals. If worked or grazed when saturated they will puddle and become even more difficult to manage.

Capability unit IIIe-25

This unit consists of gently sloping to strongly sloping, moderately deep, eroded soils that are well drained to somewhat excessively drained. The soils in this unit are—

Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded.
Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded.
Glenelg silt loam, 3 to 8 percent slopes, severely eroded.
Glenelg silt loam, 8 to 15 percent slopes, moderately eroded.
Manor silt loam, 3 to 8 percent slopes, severely eroded.
Manor silt loam, 8 to 15 percent slopes, moderately eroded.

These soils occur mostly in the central and southeastern parts of the county, but there are some small areas in the northwestern part. The total area is 40,967 acres—about 13 percent of the area of the county.

Because of their extent, these soils are extremely important to the agricultural economy of the county. However, they are seriously in need of intensive management. Emphasis on cultivated crops will hasten their deterioration, but a cultivated crop can be grown once every 4 or 5 years under intensive management.

These soils are used for most crops commonly grown and for pasture and some orchard crops. Their best use is permanent pasture. Dairy and livestock farms predominate.

Rotations should be at least 4 years long, and hay or other close-growing crops should be grown for at least 3 years. In some places it is desirable to keep the soils in continuous hay and to plow and reseed only if production is poor or the surface soil becomes sodbound. Hay can be grazed part of the time.

Fertility can be maintained by applying fertilizer and manure and by growing green-manure and cover crops. Cover crops will also help control erosion.

These soils should be contour tilled and contour stripcropped. Strips should be narrower than on less strongly sloping soils. Special care is needed to dispose of excess water because these soils are easily eroded.

Capability unit IIIw-1

The only soil in this unit is Melvin silt loam, 0 to 3 percent slopes. This is a poorly drained, flood-plain soil that has been influenced by lime. It occurs on the wettest parts of the Potomac River flood plain. Most of it is flooded periodically. Its total area is 1,226 acres—about four-tenths of 1 percent of the area of the county.

This soil can be made fairly productive if well managed, but it is not suitable for crops or improved pasture unless drained and protected from floods. Pasture is the most common use. Some corn and hay are grown. Cultivated areas should be protected by interceptor ditches, and surface water should be removed through V-ditches. Drainageways should be kept clean, straightened if necessary, and sodded to prevent scouring. Pastures should be mowed, and livestock should be kept out when the soil is wettest.

Areas that cannot feasibly be drained can be planted to Reed canarygrass, which grows well in wet soils and, though not highly palatable, provides some browse for cattle.

Capability unit IIIs-1

This unit consists of gently sloping to strongly sloping, excessively drained, very sandy soils that have a very deep, very sandy subsoil. The soils in this unit are—

Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded.
Rumford loamy sand, 3 to 8 percent slopes, moderately eroded.

These soils occur in scattered areas along the eastern edge of the county, between Fairland and Burtonsville. The total area is 111 acres—less than one-tenth of 1 percent of the area of the county.

If farmed these soils are generally included with larger areas. Droughtiness and low fertility limit their use for crops. They are easily worked, however, and some areas are used for small gardens. Other areas are idle or support poor, second-growth stands of Virginia pine. The Rumford soil is slightly more productive than the Lakeland soil.

These soils can be used for most crops, but yields normally are low. Deep-rooted crops are generally the most productive, but alfalfa is not well suited. Orchards are well suited to these soils.

To keep these soils productive, heavy applications of fertilizer, especially nitrogen and potash, are necessary. The soils are acid and should be limed. Lime should be applied according to the results of soil tests. On very sandy soils, because there is less danger of overliming, ground limestone is as good as, or better than, burned or hydrated lime.

If these soils are kept in vegetation, there is little danger of further damage by erosion. Irrigation by sprinkler would benefit crops.

Capability unit IIIs-7

This unit consists of shallow, gently sloping to strongly sloping soils that tend to be droughty. The soils in this unit are—

Brandywine loam, 3 to 15 percent slopes, moderately eroded.
Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded.
Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded.

These soils occur mostly in the northwestern part of the county, near the Frederick County line. The total area is 4,812 acres—about 1½ percent of the area of the county. The Linganore soils occupy 4,514 acres.

These soils are low in fertility. Generally, they are only a foot or less in depth to the parent rock. If they are well fertilized and if rainfall is adequate, yields are moderately high.

These soils are used mostly for general farming. All crops common to the county are grown. Some alfalfa is grown for hay. Although much of the acreage is in pasture, these soils are not well suited to pasture. At best, the carrying capacity is low and the soils are easily overgrazed. In hot dry weather, the pastures brown out for longer periods than do pastures on the better soils in the area.

Rotations at least 3 or 4 years long are needed to protect these soils from further erosion. Corn should be followed by 2 years or more of hay if no small grain is included in the rotation. If a small grain is included, the rotation should be at least 4 years long.

The soils in this unit need organic matter, which can be supplied by growing deep-rooted legumes, turning under crop residues, and applying manure. Large amounts of complete fertilizer are also needed. Soil tests should be made to determine how much fertilizer to apply.

Controlling erosion is a serious problem. Although the soils are readily permeable, their water-absorbing and water-holding capacity is low and much water runs off after heavy rains. Rills develop quickly and, if not checked, will enlarge and become gullies. All farming operations should be on the contour, and close-growing vegetation should be kept on the soils as much of the time as possible.

Irrigation would be beneficial to these soils, but it may not be economically feasible.

Capability unit IVe–3

This unit consists of deep, rolling to hilly, well-drained soils that are limited by the hazard of erosion. The soils in this unit are—

Chester silt loam, 8 to 15 percent slopes, severely eroded.
Elioak silty clay loam, 8 to 15 percent slopes, severely eroded.
Elk silty clay loam, 8 to 15 percent slopes, severely eroded.
Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded.
Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded.

These soils are scattered throughout the county. The total area is 628 acres—about two-tenths of 1 percent of the area of the county.

If not carefully managed, these soils will soon become too seriously eroded to be used for crops. A cultivated crop should be grown only once in 5 years. Close-growing crops should be grown the rest of the time. A common rotation consists of 1 year of small grain followed by 3 years or more of hay. Alfalfa is a suitable hay crop. One of the best uses for these soils is grass-clover pasture.

Capability unit IVe–7

This unit consists of hilly soils that have a dense, or compact, gravelly subsoil or substratum. The soils in this unit are—

Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded.
Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded.
Chillum silt loam, 15 to 25 percent slopes, moderately eroded.
Croom gravelly loam, 8 to 15 percent slopes, severely eroded.
Croom gravelly loam, 15 to 25 percent slopes, moderately eroded.

These soils are in the extreme eastern and southeastern parts of the county. The total area is 680 acres—about two-tenths of 1 percent of the area of the county. A considerable acreage is in the expanding suburban development near the District of Columbia.

These soils can be used for special crops or, infrequently, for cultivated crops but are best suited to hay and pasture. If used even occasionally for crops, they must be carefully managed and protected from further erosion. Close-growing crops are best, and they should be grown in contour strips that are carefully drained of excess surface water.

Large applications of fertilizer and adequate applications of lime are needed, as well as manure and crop residues to furnish organic matter.

Capability unit IVe–10

This unit consists of rolling to hilly, shallow to very shallow soils. The soils in this unit are—

Brandywine loam, 3 to 15 percent slopes, severely eroded.
Brandywine loam, 15 to 25 percent slopes, moderately eroded.
Eroded land, Penn materials.
Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded.
Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded.
Legore silt loam, 8 to 15 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded.
Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded.
Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded.
Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded.
Manor channery silt loam, 8 to 15 percent slopes, severely eroded.
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded.
Penn silt loam, 8 to 15 percent slopes, severely eroded.
Penn silt loam, 15 to 25 percent slopes, moderately eroded.

The soils in this unit are very extensive. They occur mostly in the western and northwestern parts of the county, and the total area is 24,187 acres—about 7.7 percent of the area of the county. They make up about 70 percent of the class IV soils in the county.

In general, these soils are droughty and low in fertility. About three-fourths of the acreage is severely eroded, and the rest is moderately eroded.

A considerable part of the less eroded acreage, mostly on fairly steep slopes near streams and drainageways, is in woodlots. The cleared areas are used principally for hay or pasture. Yields of hay are not high, and the

carrying capacity of the pastures is low. Most of the common crops can be grown, but a cultivated crop should be grown only once in about 5 years. One suitable rotation consists of corn followed by 5 years of mixed hay; another consists of a small grain followed by 3 or 4 years of alfalfa. The hay can be grazed part of the time. Continuous hay and permanent pasture are also suitable cropping systems. Orchards could probably be established on some of these soils.

The principal management problems are maintaining fertility and controlling erosion. Supplemental irrigation, especially in midsummer, would benefit hay and pasture.

Capability unit IVe-25

This unit consists of well-drained, rolling to hilly soils that are moderately deep. The soils in this unit are—

Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded.
Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded.
Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded.
Glenelg silt loam, 8 to 15 percent slopes, severely eroded.
Glenelg silt loam, 15 to 25 percent slopes, moderately eroded.
Manor silt loam, 8 to 15 percent slopes, severely eroded.
Manor silt loam, 15 to 25 percent slopes, moderately eroded.

These soils are extensive. They total 32,200 acres, or nearly 10 percent of the area of the county.

These soils erode readily and should be cultivated only infrequently. Some of the acreage is in forest, and some is in urban developments, but some is farmed. Most of the cleared acreage is in hay or pasture. Corn, small grains, and fruits are the principal cultivated crops. There are a few nurseries and other specialty farms.

One common 5-year rotation consists of corn followed by hay; another, of a small grain followed by alfalfa. Alfalfa is fairly well suited and produces good yields under good management.

Alfalfa adds nitrogen to the soils and, if the stands are good, protects the soils from erosion. Alfalfa needs phosphate, potash, and lime. A well-balanced fertilization program, based on the results of soil tests, will help maintain the vegetation that is needed to prevent further erosion.

Crops should be planted in contour strips. Diversion terraces will help dispose of excess water, but the outlets must be well built and carefully maintained to prevent gullying.

Capability unit IVe-41

This unit consists of severely eroded, shallow soils that have a tight subsoil. The soils in this unit are—

Aldino silt loam, 8 to 15 percent slopes, severely eroded.
Iredell silty clay loam, 3 to 15 percent slopes, severely eroded.
Urbana silt loam, 8 to 15 percent slopes, severely eroded.

The total area is only 148 acres—or much less than one-tenth of 1 percent of the area of the county.

Some areas of these soils are used for pasture or crops, but many areas are idle. Yields of hay are good, but yields of other crops are poor.

If these soils are used for crops, they need careful management. First, they should be adequately limed and fertilized. They can then be seeded to a hay crop, such as alsike clover and orchardgrass or timothy. They should remain in hay for at least 3 years. The hay can be cut and fertilized as needed. After 3 or 4 years, the sod can be broken and a crop, preferably a small grain, seeded. The small grain should be followed directly by hay. The hay can be grazed part of the time but should not be overgrazed. After the soils improve, they can be used occasionally for a cultivated crop.

Another use for these soils is permanent pasture. After the soils are adequately limed and fertilized, grass can be seeded with alsike clover or some other clover. The pastures should not be grazed until the stands are well established. Grazing should be controlled. No grazing should be permitted during extended droughts or when the soil is excessively wet and could be damaged by trampling. Weeds should be controlled by mowing or other means. Heavy applications of barnyard manure would benefit the pastures.

Capability unit IVw-3

This unit consists of somewhat poorly drained to moderately well drained, silty soils that have a very dense, compact subsoil. The soils in this unit are—

Iredell silt loam, 0 to 3 percent slopes.
Iredell silt loam, 3 to 8 percent slopes, moderately eroded.
Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded.
Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded.

The total area is 985 acres—about three-tenths of 1 percent of the area of the county.

These soils are used for both crops and pasture. Some corn and hay are grown, and, where drainage is established, some small grain is grown. Productivity, however, is low.

These soils are hard to manage. They become very hard when dry, and in eroded areas the tough subsoil interferes with plowing. But the main problem is removing excess water without increasing the hazard of erosion. The dense, almost impermeable subsoil makes this difficult. Shallow ditches can be used to remove surface water from the nearly level areas. On the stronger slopes, runoff is rapid and the erosion hazard is serious. Full use of these soils is not possible unless they are drained to remove excess water and irrigated during dry seasons.

Capability unit Vw-2

This unit consists of poorly drained soils on flats and in depressions. These soils are not on the flood plains of streams but occupy upland flats, depressions, and sloping areas around and above the heads of small, intermittent drains. They are also on some poorly drained spots on old stream terraces. The soils in this unit are—

Calvert silt loam, 0 to 8 percent slopes.
Croton silt loam, 0 to 8 percent slopes.
Roanoke silt loam, 0 to 8 percent slopes.
Watchung silt loam, 0 to 8 percent slopes.
Worsham silt loam, 0 to 8 percent slopes.

These soils occur in small, scattered areas in all parts of the county except the Coastal Plain. Their total area is 14,191 acres—about 4.5 percent of the area of the county.

Much of the acreage is cleared, but a few areas are in water-tolerant trees. Most of the cleared areas are in unimproved or partly improved pasture. Some areas are in hay, and some improved spots are in corn. These soils, however, are too wet in spring for corn to germinate properly. Many areas are idle. Probably the most suitable use for these soils is pasture.

Drainage should be improved as much as possible by intercepting runoff from higher areas and using open, V-type ditches to dispose of surface water. Tile drains are satisfactory in some places but may be too expensive to be practical.

Capability unit VIe–2

This unit consists of steep, sandy and gravelly soils that are limited in use by the hazard of erosion. The soils in this unit are—

Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded.
Croom gravelly loam, 15 to 25 percent slopes, severely eroded.
Croom gravelly loam, 25 to 45 percent slopes, moderately eroded.

These soils are adjacent to the Prince Georges County line. They are on the steepest part of the Coastal Plain near its juncture with the Piedmont Plateau. The total area is only 633 acres—about two-tenths of 1 percent of the area of the county.

The soils in this unit are mostly on the sides of ravines that have cut into the gravelly and sandy formations of the Coastal Plain. Much of the acreage has not been cleared or, if cleared, has reverted to forest.

Because of the hazard of erosion, cultivated crops are not suitable. Even hay crops may cause further erosion. Except for forest, the only suitable use is pasture. If seedings of redtop, timothy, or orchardgrass can be established, these soils can be lightly grazed from time to time. These grasses will not produce a heavy sod, especially on these soils, so even light grazing may cause the soils to erode. Bluegrass and other better sod plants are not suitable. The best use for these soils is forest.

Capability unit VIe–3

This unit consists of shallow soils that are sloping and very severely eroded or steep and moderately eroded. The soils in this unit are—

Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded.
Glenelg silt loam, 15 to 25 percent slopes, severely eroded.
Glenelg soils, 25 to 45 percent slopes, moderately eroded.
Legore silt loam, 15 to 25 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded.
Manor channery silt loam, 15 to 25 percent slopes, severely eroded.
Manor channery silt loam, 25 to 45 percent slopes, moderately eroded.
Manor silt loam, 15 to 25 percent slopes, severely eroded.
Manor silt loam, 25 to 45 percent slopes, moderately eroded.
Manor soils, 8 to 15 percent slopes, very severely eroded.
Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded.
Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded.
Penn silt loam, 8 to 15 percent slopes, very severely eroded.
Penn silt loam, 15 to 25 percent slopes, severely eroded.
Penn silt loam, 25 to 45 percent slopes, moderately eroded.

These soils occur in all parts of the county except the Coastal Plain. The total area is 21,662 acres—about 6.8 percent of the area of the county.

Much of the acreage has been cleared, but the steepest, least eroded areas are mostly in forest. Many cleared areas are used for pasture or are idle. Some severely eroded areas are still used for crops, but many have been abandoned.

These soils will erode further if used for crops. Restricted grazing is the most intensive use to which they are suited. At present the pastures are poor, but even the most severely eroded pastures could be improved by liming, fertilizing, and reseeding. A mixture of orchardgrass and ladino clover is good for establishing a pasture stand. The best sod consists of bluegrass and clover, but bluegrass need not be seeded except where it seems advisable to establish a sod quickly. If the fertility of the soils is improved, bluegrass will reestablish itself.

Pastures should not be grazed until the sod becomes well established. Only moderate grazing should be allowed at any time. To prevent further erosion, the sod should remain intact.

The mowing of brush and weeds is a problem on these soils. Areas that are too steep or too rough for tractors can be mowed with horse-drawn machines. Where even this method is not practical, a hand scythe or chemicals can be used to remove weeds. Sassafras and hickory sprouts must be controlled, but a few larger trees can be left for shade. Terraces would slow runoff and permit more water to permeate to the subsoil.

Areas that cannot be used for pasture can be reforested. Forest is a better use than poorly managed pasture. Forested areas, particularly those that have stands of young trees, must be protected from fire and from grazing and trampling by livestock.

Capability unit VIw–1

This unit consists of poorly drained soils that are not influenced by lime and are subject to frequent flooding. The soils in this unit are—

Bowmansville silt loam, 0 to 3 percent slopes.
Mixed alluvial land.
Wehadkee silt loam, 0 to 3 percent slopes.

These soils occur on the wettest parts of the flood plains. They are frequently flooded by stream overflow, especially in spring after heavy rains or thaws. In winter and in spring, they are saturated most of the time. The total area is 13,476 acres—about 4.3 percent of the area of the county.

The cleared areas are used mostly for seasonal pasture, but many furnish practically no grazing. In places there are growths of willow, alder, birch, and other water-tolerant trees. A large part of the acreage is idle. Where the soils have been partly drained, some hay is grown. Corn is seldom planted.

Complete artificial drainage and protection from flooding would not be economical, and in places it would not be possible. Wetness is somewhat alleviated if runoff from higher areas is intercepted and channelled through

outlets to streams. In some spots surface drainage can be improved by open, V-type ditches. Along some of the smaller streams, flooding can be controlled by cleaning, straightening, and deepening the channels. Sodding the banks of streams after improving the channels will prevent streambank erosion.

Areas so protected can be used for hay but are better suited to pasture. Bluegrass probably will become established without seeding. In many places, one of the tall grasses can be grown. Areas that cannot be drained can be planted to Reed canarygrass, which will furnish some grazing and can be cut for hay. This grass is less palatable than most of the common hay and pasture plants but can be combined with more palatable material for silage.

Pastures should not be overgrazed and should not be trampled when wet. They should be used only temporarily, when the surface soil is comparatively dry.

Capability unit VIs–2

This unit consists of gently sloping to strongly sloping, well-drained soils that are very stony. Stoniness is the significant characteristic that limits the use of these soils. The soils in this unit are—

Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded.
Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded.
Stony land, Manor materials, 3 to 15 percent slopes.

Most of the acreage is on ridges in the extreme northwestern part of the county. Small areas are on the palisades along the Potomac River. The total area is only 729 acres—about two-tenths of 1 percent of the area of the county.

Most areas are in forest and should remain in forest. Cleared areas can be used for pasture. They should be cleared of stones, limed and fertilized, and seeded to a mixture of grass and clover. After pastures are established, these soils can be managed in about the same way as the soils in capability units IIe–10 and IIIe–10. Controlling weeds and brush may be difficult. Areas not in pasture should be reforested. If carefully managed, forests should yield satisfactory returns.

Capability unit VIIe–3

This unit consists of rolling to very steep soils that are commonly shallow and are severely limited by the hazard of erosion. The soils in this unit are—

Brandywine loam, 15 to 25 percent slopes, severely eroded.
Croom gravelly loam, 25 to 45 percent slopes, severely eroded.
Glenelg soils, 25 to 45 percent slopes, severely eroded.
Gullied land, Penn materials.
Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded.
Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded.
Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded.
Manor channery silt loam, 25 to 45 percent slopes, severely eroded.
Manor soils, 15 to 25 percent slopes, very severely eroded.
Manor soils, 25 to 45 percent slopes, severely eroded.
Manor soils, 45 to 65 percent slopes.
Penn soils, 45 to 65 percent slopes.

These soils occur throughout the county. Their total area is 5,834 acres—about 1.8 percent of the area of the county. They are low in fertility and moisture-supplying capacity and tend to be droughty in midsummer. In places they contain many small fragments of rock.

The soils in this unit are not suitable for crops or pasture. Areas that have been cultivated are now severely eroded and are mostly idle or in very poor pasture. Some of the less eroded areas are in forest.

To prevent further deterioration, as much of the acreage as possible should be reforested. Livestock should not be allowed to browse in the reforested areas, and fires should be prevented. If reforestation is contemplated, advice and assistance can be obtained from the county agent's office.

Capability unit VIIs–1

The only soil in this unit is Lakeland loamy sand, 15 to 25 percent slopes, severely eroded. It is a rolling, severely eroded, very sandy soil that has a deep, very sandy subsoil. The total area is only 19 acres. Much of the acreage is idle or in poor growths of Virginia pine or scrub oak or both. This soil is droughty and low in fertility. It is not suited to crops and, at best, is suited to very limited grazing. Pine might do well on this soil.

Capability unit VIIs–2

This unit consists of gently sloping to steep soils that are very stony. The soils in this unit are—

Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded.
Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded.
Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded.
Stony land, Manor materials, 15 to 45 percent slopes.

The total area is 1,128 acres—less than four-tenths of 1 percent of the area of the county.

Except for forests, watersheds, and wildlife habitats, these soils are of little use in agriculture. Most of the acreage is too steep, stony, or eroded to be used even for pasture. The less eroded areas are mostly in forest and should remain in forest. Areas that have been cleared and farmed are now severely eroded.

If protected from fire and fenced to prevent grazing, some of this acreage may reforest naturally. The rest should be replanted. If reforested, these areas eventually may yield more income from forest products than they would yield from farm crops.

Capability unit VIIIs–2

This unit consists entirely of Rock land, a miscellaneous land type that occurs mostly at or south of Great Falls and consists of rocky reefs and islands in the Potomac River and some rocky areas along the shore. There are a few scattered areas in the northwestern part of the county and along the palisades. The total area is 967 acres.

These rocky areas have no economic use in agriculture. Although some areas have a cover, or partial cover, of

trees, the trees are not suitable for timber or other forest products. Most areas make good wildlife habitats and are of considerable importance for recreational activities.

Capability unit VIIIs-3

This unit consists only of barren pits left after gravel was removed for building roads and for other purposes. These areas are mapped as Gravel pit. The total area is 221 acres. Most of these areas are in the extreme eastern and southeastern parts of the county. They serve no useful purpose now but eventually may become partly revegetated and furnish some shelter for wildlife. If the excavations are deep enough and an impervious substratum is reached, ponds may develop that can be stocked with fish and will provide water for birds and animals. Some areas could be reforested, but reforestation would not be economically practical.

Estimated Yields

The soils of Montgomery County vary considerably in productivity. Some consistently produce high yields of cultivated crops, and others are better suited to less intensive uses.

Table 3 shows the average estimated yields of specified crops under present management and under the improved management suggested in the discussions of individual capability units. These yields are averages for a normal 5-year period. In any given crop year, the yield of any crop may be more or less than the figure shown.

These estimates are based on information obtained from the local representatives of the Soil Conservation Service, from the county agent, and from agricultural workers at the Maryland Agricultural Experiment Station and also on the observations of farmers in the county.

The yields under improved management are not presumed to be the maximum obtainable. Yields from the same soils vary, depending on variations in management, weather, crop varieties, and diseases.

Improved management includes some or many of these management practices:

1. Necessary conservation measures, which may include stripcropping, contour tillage, terracing, or contour furrowing; drainage; water control on both drained and undrained soils, especially disposal of excess water; and irrigation where needed and feasible.
2. Selection of varieties of crops suitable to the soil and the county.
3. Rotations of adequate length, usually including the following: A tilled crop to control weeds; a deep-rooted crop to improve permeability; one or more crops of legumes to maintain or improve fertility; and a close-growing crop or green-manure crop to improve structure and tilth, supply organic matter, and control erosion.
4. Return of manure and crop residues to the soil to supply nitrogen and other nutrients and to improve the physical characteristics of the soil.
5. Application of fertilizer and lime as indicated by soil tests. The county agent's office can be consulted about soil-testing service.
6. Suitable methods of plowing, preparing the seedbed, and cultivating.
7. Planting, cultivating, and harvesting at the proper time and in the proper way.
8. Control of weeds, diseases, and insects.

TABLE 3.—*Estimated average acre yields of*

[In columns A are yields under present management; in columns B are yields under improved management. Where yields

Soil	Corn		Wheat		Barley		Oats	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Aldino silt loam, 0 to 3 percent slopes	25	35	10	15	15	25		
Aldino silt loam, 3 to 8 percent slopes, moderately eroded	25	35	10	15	15	25		
Aldino silt loam, 8 to 15 percent slopes, moderately eroded	20	30	10	15	15	25		
Aldino silt loam, 8 to 15 percent slopes, severely eroded	15	25	8	12	10	15		
Ashton silt loam, 0 to 3 percent slopes	65	100	40	60	50	75	45	70
Ashton silt loam, 3 to 8 percent slopes, moderately eroded	55	85	35	50	45	65	40	60
Beltsville silt loam, 0 to 3 percent slopes, moderately eroded	30	45	15	20	25	35		
Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	25	35	12	20	20	30		
Beltsville silt loam, 8 to 15 percent slopes, moderately eroded	20	30	10	15	15	25		
Bermudian silt loam, 0 to 3 percent slopes	55	85						
Bermudian silt loam, 3 to 8 percent slopes	45	75						
Bowmansville silt loam, 0 to 3 percent slopes								
Brandywine loam, 3 to 15 percent slopes, moderately eroded	30	40	15	20	20	30	20	30
Brandywine loam, 3 to 15 percent slopes, severely eroded	20	30	10	15	15	25	15	25
Brandywine loam, 15 to 25 percent slopes, moderately eroded	25	35	12	18	15	25	15	25
Brandywine loam, 15 to 25 percent slopes, severely eroded								
Bucks silt loam, 0 to 3 percent slopes	60	85	25	35	35	45	35	50
Bucks silt loam, 0 to 3 percent slopes, moderately eroded	55	80	22	30	30	40	30	45
Bucks silt loam, 3 to 8 percent slopes, moderately eroded	45	65	20	30	30	40	30	40
Bucks silt loam, 3 to 8 percent slopes, severely eroded	35	55	15	25	25	35	25	35
Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded	30	45	12	20	22	30	20	30
Calvert silt loam, 0 to 8 percent slopes								
Captina silt loam, 0 to 3 percent slopes	50	80	20	30	22	35	22	32
Captina silt loam, 3 to 8 percent slopes, moderately eroded	35	55	17	27	18	30	18	30
Chester silt loam, 0 to 3 percent slopes	65	100	30	40	45	60	45	60
Chester silt loam, 0 to 3 percent slopes, moderately eroded	60	95	25	35	40	55	40	55
Chester silt loam, 3 to 8 percent slopes, moderately eroded	55	85	25	35	40	55	40	55
Chester silt loam, 3 to 8 percent slopes, severely eroded	45	65	20	25	30	40	30	40
Chester silt loam, 8 to 15 percent slopes, moderately eroded	50	70	22	30	35	45	35	45
Chester silt loam, 8 to 15 percent slopes, severely eroded	35	50	17	22	25	35	25	35
Chewacla silt loam, 0 to 3 percent slopes								
Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded	25	35	12	20	20	30		
Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded	20	30	10	15	15	25		
Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded	20	30	10	15	15	25		
Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded	15	22	8	10	10	15		
Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded	15	22	8	10	10	15		
Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded								
Chillum silt loam, 3 to 8 percent slopes, moderately eroded	25	35	12	20	20	30		
Chillum silt loam, 8 to 15 percent slopes, moderately eroded	20	30	10	15	15	25		
Chillum silt loam, 15 to 25 percent slopes, moderately eroded	15	22	8	10	10	15		
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded	25	35	12	20	20	30		
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded	20	30	10	15	15	25		
Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded	20	30	10	15	15	25		
Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded								
Chrome silt loam, 8 to 15 percent slopes, moderately eroded	20	28	8	12	15	25		
Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded								
Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded	20	28	8	12	15	25		
Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded	15	20						
Colluvial land	35	50						
Congaree silt loam, 0 to 3 percent slopes	60	90						
Conowingo silt loam, 0 to 3 percent slopes, moderately eroded	20	30	8	12	15	25		

specified crops under two levels of management

are not given, either the soil is considered unsuitable for that crop or no information is available on which to base an estimate]

Alfalfa		Alfalfa and grass		Timothy and red clover		Ladino clover and orchardgrass		Sorghum and soybeans		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
				0.7	1.0	1.0	1.5			50	70
				.7	1.0	1.0	1.5			45	65
				.6	.8	.8	1.2			40	60
				.4	.7	.6	1.0			20	50
3.5	5.5	2.7	4.2	2.5	3.5	3.0	4.0	9.5	12.5	160	190
3.0	5.0	2.2	3.7	2.2	2.8	2.6	3.5	8.0	11.2	145	175
				1.2	1.8	1.5	2.2			80	110
				.9	1.5	1.1	1.9			70	100
				.7	1.1	.9	1.4			50	
				2.0	2.5	2.5	3.2	8.0	11.2	155	185
				1.6	2.1	2.0	2.8	6.4	9.6	135	165
										70	100
1.4	2.2	1.0	1.6	.9	1.3	1.4	1.9	4.0	6.0	60	90
				.7	1.1	1.0	1.4			40	55
1.2	2.0	.9	1.5	.8	1.2	1.2	1.7			45	60
3.0	4.0	2.3	3.0	1.8	2.6	2.2	3.2	8.0	10.8	100	140
2.6	3.4	2.0	2.6	1.6	2.4	2.0	3.0	7.8	10.0	95	130
2.2	3.0	1.7	2.3	1.4	2.0	1.8	2.6	6.8	8.8	85	120
1.6	2.4	1.2	1.8	1.1	1.6	1.4	2.0	4.8	7.2	65	100
1.2	2.0	.9	1.5	.9	1.4	1.1	1.8	3.6	6.0	50	80
										65	100
				1.6	2.6	2.1	3.5	6.0	9.6	130	160
				1.3	2.2	1.7	2.9	4.8	8.0	110	140
3.0	4.0	2.3	3.0	2.2	2.8	2.8	3.7	9.2	12.0	140	175
2.8	3.6	2.1	2.7	2.0	2.6	2.6	3.6	8.8	11.6	130	165
2.8	3.6	2.1	2.7	1.9	2.5	2.5	3.4	8.4	10.8	125	160
2.4	3.2	1.8	2.4	1.6	2.2	2.1	3.0	6.8	9.2	100	130
2.6	3.4	2.0	2.6	1.7	2.4	2.3	3.2	7.5	10.0	110	140
2.0	3.0	1.5	2.2	1.4	2.0	1.8	2.6	6.0	8.4	80	125
										120	150
				.9	1.5	1.1	1.9			70	100
				.7	1.1	.9	1.4			50	75
				.7	1.1	.9	1.4			50	75
				.5	.8	.8	1.0			35	60
				.5	.8	.8	1.0			35	60
										30	50
				.9	1.5	1.1	1.9			70	100
				.7	1.1	.9	1.4			50	75
				.5	.8	.8	1.0			35	60
				.9	1.5	1.1	1.9			70	100
				.7	1.1	.9	1.4			50	75
				.7	1.1	.9	1.4			50	75
										35	60
				.7	1.0	.8	1.5			45	65
				.7	1.0	.8	1.5			45	65
				.5	.7	.6	.9			30	40
				1.4	1.9	1.8	2.5			85	120
				2.0	2.6	2.5	3.2	8.0	10.8	155	185
				.7	1.0	.8	1.5			45	65

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of specified*

[In columns A are yields under present management; in columns B are yields under improved management. Where yields

Soil	Corn		Wheat		Barley		Oats	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Conowingo silt loam, 0 to 3 percent slopes, severely eroded	15	20			12	20		
Croom gravelly loam, 3 to 8 percent slopes, moderately eroded	20	35	10	15	15	25	15	25
Croom gravelly loam, 8 to 15 percent slopes, moderately eroded	18	30	10	15	12	20	12	20
Croom gravelly loam, 8 to 15 percent slopes, severely eroded	15	25			10	15	10	15
Croom gravelly loam, 15 to 25 percent slopes, moderately eroded	15	25			10	15	10	15
Croom gravelly loam, 15 to 25 percent slopes, severely eroded								
Croom gravelly loam, 25 to 45 percent slopes, moderately eroded								
Croom gravelly loam, 25 to 45 percent slopes, severely eroded								
Croton silt loam, 0 to 8 percent slopes								
Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded	35	50	18	25	25	35	25	35
Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded	20	35	14	20	20	28	20	28
Elioak silt loam, 0 to 3 percent slopes	60	85	25	40	35	50	35	50
Elioak silt loam, 3 to 8 percent slopes, moderately eroded	50	75	20	30	30	45	30	45
Elioak silt loam, 8 to 15 percent slopes, moderately eroded	40	65	18	25	25	40	25	40
Elioak silty clay loam, 3 to 8 percent slopes, severely eroded	35	55	18	25	25	40	25	40
Elioak silty clay loam, 8 to 15 percent slopes, severely eroded	30	40	15	20	20	32	20	32
Elk silt loam, 0 to 3 percent slopes, moderately eroded	65	100	40	60	50	75	45	70
Elk silt loam, 3 to 8 percent slopes, moderately eroded	55	85	35	50	45	65	40	60
Elk silty clay loam, 8 to 15 percent slopes, severely eroded	45	65	25	35	35	55	35	55
Eroded land, Penn materials								
Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded	55	85	22	32	35	45	35	50
Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded	45	60	20	25	30	40	30	40
Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded	50	70	22	30	32	42	32	42
Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded	35	50	17	22	25	35	25	35
Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded	40	60	20	25	30	40	30	40
Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded								
Glenélg gravelly loam, 3 to 8 percent slopes, moderately eroded	55	85	22	32	35	45	35	50
Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded	45	60	20	25	30	40	30	40
Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded	50	70	22	30	32	42	32	42
Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded	35	50	17	22	25	35	25	35
Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded	40	60	20	25	30	40	30	40
Glenelg silt loam, 0 to 3 percent slopes	60	95	25	35	40	55	40	55
Glenelg silt loam, 3 to 8 percent slopes, moderately eroded	55	85	22	32	35	45	35	50
Glenelg silt loam, 3 to 8 percent slopes, severely eroded	45	60	20	25	30	40	30	40
Glenelg silt loam, 8 to 15 percent slopes, moderately eroded	50	70	22	30	32	42	32	42
Glenelg silt loam, 8 to 15 percent slopes, severely eroded	35	50	17	22	25	35	25	35
Glenelg silt loam, 15 to 25 percent slopes, moderately eroded	40	60	20	25	30	40	30	40
Glenelg silt loam, 15 to 25 percent slopes, severely eroded								
Glenelg soils, 25 to 45 percent slopes, moderately eroded								
Glenelg soils, 25 to 45 percent slopes, severely eroded								
Glenville silt loam, 0 to 3 percent slopes	50	70	20	28	30	45		
Glenville silt loam, 3 to 8 percent slopes	45	65	15	25	30	45		
Glenville silt loam, 3 to 8 percent slopes, moderately eroded	35	50	15	25	25	35		
Huntington silt loam, 0 to 3 percent slopes	70	110						
Huntington silt loam, 3 to 8 percent slopes, moderately eroded	60	90						
Iredell silt loam, 0 to 3 percent slopes	35	55	10	15	15	22		

crops under two levels of management—Continued

are not given, either the soil is considered unsuitable for that crop or no information is available on which to base an estimate]

Alfalfa		Alfalfa and grass		Timothy and red clover		Ladino clover and orchardgrass		Sorghum and soybeans		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
				0.6	0.8	0.7	1.0			35	50
				.8	1.3	1.0	1.6			55	85
				.7	1.2	.8	1.2			45	70
				.5	.7	.5	.9			30	50
				.5	.7	.5	.9			35	60
										25	40
										30	50
										85	110
2.2	3.0	1.7	2.3	1.3	1.8	1.6	2.2	5.2	7.6	65	95
1.8	2.6	1.3	1.9	1.0	1.4	1.2	1.8	4.0	5.6	50	70
2.8	3.6	2.1	2.7	1.7	2.5	2.1	3.1	7.2	10.4	95	120
2.4	3.0	1.8	2.3	1.4	2.0	1.9	2.6	6.0	8.8	85	115
2.2	3.0	1.7	2.3	1.3	1.8	1.6	2.6	5.2	7.6	85	110
2.0	2.8	1.5	2.1	1.2	1.7	1.5	2.2	4.8	7.2	80	105
1.6	2.4	1.2	1.8	.9	1.4	1.2	1.8	4.0	5.6	70	85
3.5	5.5	2.7	4.2	2.5	3.5	3.0	4.0	9.5	12.5	150	180
3.0	5.0	2.2	3.7	2.2	2.8	2.6	3.5	8.0	11.2	145	175
2.8	3.8	2.1	3.0	1.8	2.6	2.1	3.1	6.8	10.0	120	150
										40	60
2.7	4.0	2.0	3.0	1.9	2.5	2.5	3.4	7.6	10.8	125	160
2.4	3.2	1.8	2.4	1.6	2.2	2.1	3.0	6.8	9.2	100	130
2.6	3.4	1.9	2.6	1.7	2.3	2.3	3.2	7.4	10.0	110	140
2.0	3.0	1.5	2.2	1.4	2.0	1.8	2.6	6.0	8.4	80	125
2.4	3.2	1.7	2.4	1.5	2.1	2.0	2.8	6.4	9.0	85	130
										45	70
2.7	4.0	2.0	3.0	1.9	2.5	2.5	3.4	7.6	10.8	125	160
2.4	3.2	1.8	2.4	1.6	2.2	2.1	3.0	6.8	9.2	100	130
2.6	3.4	1.9	2.6	1.7	2.3	2.3	3.2	7.4	10.0	110	140
2.0	3.0	1.5	2.2	1.4	2.0	1.8	2.6	6.0	8.4	80	125
2.4	3.2	1.7	2.4	1.5	2.1	2.0	2.8	6.4	9.0	85	130
2.8	3.6	2.1	2.7	2.0	2.6	2.6	3.6	8.8	11.6	130	165
2.7	4.0	2.0	3.0	1.9	2.5	2.5	3.4	7.6	10.8	125	160
2.4	3.2	1.8	2.4	1.6	2.2	2.1	3.0	6.8	9.2	100	130
2.6	3.4	1.9	2.6	1.7	2.3	2.3	3.2	7.4	10.0	110	140
2.0	3.0	1.5	2.2	1.4	2.0	1.8	2.6	6.0	8.4	80	125
2.4	3.2	1.7	2.4	1.5	2.1	2.0	2.8	6.4	9.0	85	130
										45	70
										55	80
				1.4	2.4	1.9	3.1			110	140
				1.4	2.4	1.9	3.1			110	140
				1.2	2.2	1.7	2.8			90	120
				2.2	3.0	2.7	3.8	9.6	12.4	165	200
				2.0	2.7	2.5	3.4	8.8	11.6	160	190
				.7	1.0	1.0	1.5			50	70

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of specified*

[In columns A are yields under present management; in columns B are yields under improved management. Where yields

Soil	Corn		Wheat		Barley		Oats	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Iredell silt loam, 3 to 8 percent slopes, moderately eroded	30	50	10	15	15	22		
Iredell silty clay loam, 3 to 15 percent slopes, severely eroded	20	30						
Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded	15	30			10	15	10	18
Lakeland loamy sand, 15 to 25 percent slopes, severely eroded								
Legore silt loam, 3 to 8 percent slopes, moderately eroded	45	65	22	30	35	45	35	45
Legore silt loam, 3 to 8 percent slopes, severely eroded	35	50	18	22	28	37	25	37
Legore silt loam, 8 to 15 percent slopes, moderately eroded	40	55	20	25	30	40	28	40
Legore silt loam, 8 to 15 percent slopes, severely eroded	30	40	15	20	20	30	20	30
Legore silt loam, 15 to 25 percent slopes, severely eroded								
Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded	35	55	15	20	20	30		
Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded	25	40	12	18	18	25		
Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded	40	60	20	25	25	35	25	35
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded	35	55	15	22	25	35	22	35
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded	25	40	10	18	18	25	18	25
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded	30	50	12	20	20	30	20	30
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded	20	30		15	15	20	15	20
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded	25	40	10	18	18	25	18	25
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded								
Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded								
Lindside silt loam, 0 to 3 percent slopes		85						
Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded	35	60	18	25	25	35	25	35
Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded	25	45	15	22	20	30	20	30
Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded	20	35	12	20	15	25	15	25
Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded	20	35	12	20	15	25	15	25
Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded	15	22	10	15	12	20	12	20
Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded								
Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded								
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded	50	80	20	30	30	40	25	40
Manor channery silt loam, 3 to 8 percent slopes, severely eroded	40	65	15	20	22	35	22	32
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded	45	70	18	22	25	38	25	38
Manor channery silt loam, 8 to 15 percent slopes, severely eroded	30	50	12	16	16	25	16	25
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded	35	60	15	20	22	35	22	32
Manor channery silt loam, 15 to 25 percent slopes, severely eroded								
Manor channery silt loam, 25 to 45 percent slopes, moderately eroded								
Manor channery silt loam, 25 to 45 percent slopes, severely eroded								
Manor silt loam, 3 to 8 percent slopes, moderately eroded	55	85	20	30	30	45	30	45
Manor silt loam, 3 to 8 percent slopes, severely eroded	45	65	17	24	25	38	25	38
Manor silt loam, 8 to 15 percent slopes, moderately eroded	50	75	20	28	28	40	28	40

crops under two levels of management— Continued

are not given, either the soil is considered unsuitable for that crop or no information is available on which to base an estimate]

Alfalfa		Alfalfa and grass		Timothy and red clover		Ladino clover and orchardgrass		Sorghum and soybeans		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
				0.7	1.0	1.0	1.5			45	65
				.4	.7	.6	1.0			20	50
				.5	.8	.6	1.0			25	40
2.6	3.6	2.0	2.7	1.6	2.2	2.0	2.7	6.8	9.2	90	120
1.8	2.6	1.4	2.0	1.4	1.9	1.7	2.4	6.0	7.6	70	95
2.0	3.0	1.5	2.2	1.5	2.0	1.8	2.5	6.4	8.8	80	105
1.2	2.2	.9	1.6	.9	1.5	1.3	1.8	4.2	6.0	60	85
										40	60
				.8	1.3	1.0	1.5			85	115
				.6	1.0	.9	1.3			60	90
2.0	2.8	1.5	2.1	1.2	1.6	1.6	2.1	4.8	7.2	60	90
1.8	2.6	1.3	1.9	1.1	1.5	1.5	2.0	4.4	6.8	60	90
1.4	2.0	1.0	1.5	.8	1.2	1.1	1.7	3.2	5.6	45	65
1.6	2.3	1.1	1.7	.9	1.3	1.2	1.8	3.6	6.0	50	70
1.2	1.8	.9	1.3	.6	1.0	.9	1.4	2.4	4.4	40	60
1.4	2.0	1.0	1.5	.8	1.2	1.1	1.6	3.2	5.6	45	65
										35	55
										130	160
1.8	2.6	1.4	2.0	1.2	1.7	1.6	2.3	4.8	6.8	70	100
1.4	2.2	1.1	1.7	1.0	1.5	1.4	2.0	4.0	6.0	60	90
1.0	1.6	.8	1.2	.7	1.2	1.0	1.5	2.8	4.8	45	60
1.0	1.6	.8	1.2	.7	1.2	1.0	1.5	2.8	4.8	45	60
				.6	1.0	.9	1.3	2.4	4.4	40	55
2.2	2.8	1.7	2.1	1.3	1.8	1.8	2.5	5.6	8.0	75	110
1.8	2.6	1.3	1.9	1.2	1.7	1.6	2.2	4.8	6.8	65	95
2.0	2.8	1.5	2.1	1.2	1.7	1.6	2.4	5.2	7.2	70	100
1.4	2.0	1.1	1.5	.8	1.2	1.0	1.5	3.6	5.6	40	55
1.8	2.6	1.3	1.9	1.0	1.5	1.4	2.2	4.8	6.8	65	95
										35	50
										40	60
2.4	3.4	1.8	2.5	1.5	2.3	1.9	2.6	6.4	8.8	90	120
1.8	2.8	1.3	2.1	1.3	1.8	1.6	2.3	5.6	7.2	80	105
2.0	3.0	1.5	2.3	1.4	1.9	1.8	2.4	6.0	7.6	85	110

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of specified*

[In columns A are yields under present management; in columns B are yields under improved management. Where yields

Soil	Corn		Wheat		Barley		Oats	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Manor silt loam, 8 to 15 percent slopes, severely eroded	35	50	12	20	20	30	20	30
Manor silt loam, 15 to 25 percent slopes, moderately eroded	45	60	15	25	25	35	25	35
Manor silt loam, 15 to 25 percent slopes, severely eroded								
Manor silt loam, 25 to 45 percent slopes, moderately eroded								
Manor soils, 8 to 15 percent slopes, very severely eroded								
Manor soils, 15 to 25 percent slopes, very severely eroded								
Manor soils, 25 to 45 percent slopes, severely eroded								
Manor soils, 45 to 65 percent slopes								
Melvin silt loam, 0 to 3 percent slopes	60	90						
Mixed alluvial land								
Montalto silt loam, 3 to 8 percent slopes, moderately eroded	60	95	28	35	40	55	35	55
Montalto silt loam, 8 to 15 percent slopes, moderately eroded	50	80	25	32	38	48	32	50
Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded								
Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded								
Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded								
Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded	50	80	20	30	30	40	30	40
Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded	40	65	16	25	28	38	28	38
Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded	35	60	15	21	25	35	25	35
Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded	25	45	10	18	15	20	15	20
Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded								
Penn silt loam, 0 to 3 percent slopes, moderately eroded	50	70	18	25	28	38	28	40
Penn silt loam, 3 to 8 percent slopes, moderately eroded	45	65	15	25	25	35	25	35
Penn silt loam, 3 to 8 percent slopes, severely eroded	35	55	12	20	22	30	20	30
Penn silt loam, 8 to 15 percent slopes, moderately eroded	40	60	15	22	25	35	25	35
Penn silt loam, 8 to 15 percent slopes, severely eroded	25	40	10	15	15	20	15	20
Penn silt loam, 8 to 15 percent slopes, very severely eroded								
Penn silt loam, 15 to 25 percent slopes, moderately eroded	30	45	12	18	20	28	20	28
Penn silt loam, 15 to 25 percent slopes, severely eroded								
Penn silt loam, 25 to 45 percent slopes, moderately eroded								
Penn soils, 45 to 65 percent slopes								
Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded								
Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded								
Readington silt loam, 0 to 3 percent slopes	50	70	18	25	25	40		
Readington silt loam, 0 to 3 percent slopes, moderately eroded	45	65	16	25	22	40		
Readington silt loam, 3 to 8 percent slopes, moderately eroded	40	60	14	22	18	30		
Roanoke silt loam, 0 to 8 percent slopes								
Rowland silt loam, 0 to 8 percent slopes		75						
Rumford loamy sand, 3 to 8 percent slopes, moderately eroded	25	40	8	12	12	20	12	20
Sassafras loam, 3 to 8 percent slopes, moderately eroded	45	70	15	25	20	30	20	30
Sassafras loam, 8 to 15 percent slopes, moderately eroded	35	60	12	20	15	25	15	25
Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded	55	80	20	30	25	35	25	35
Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded	40	65	15	25	20	30	20	30
Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded	25	60	12	20	15	25	15	25
Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded	20	35	10	15	12	20	12	20
Stony land, Manor materials, 3 to 15 percent slopes								
Stony land, Manor materials, 15 to 45 percent slopes								
Urbana silt loam, 0 to 3 percent slopes	50	75	20	30	25	40		

crops under two levels of management—Continued

are not given, either the soil is considered unsuitable for that crop or no information is available on which to base an estimate]

Alfalfa		Alfalfa and grass		Timothy and red clover		Ladino clover and orchardgrass		Sorghum and soybeans		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
1.0	1.8	0.8	1.4	0.8	1.3	1.0	1.6	3.2	5.2	55	75
1.5	2.5	1.2	2.0	1.2	1.7	1.4	2.0	4.6	6.4	60	85
										35	50
										45	65
										30	45
				1.4	2.8	2.3	4.2			90	140
										65	85
3.2	4.0	2.4	3.0	2.0	2.5	2.5	3.5	8.0	11.2	125	160
3.0	4.0	2.2	3.0	1.9	2.4	2.4	3.2	7.6	10.4	115	145
										70	95
										55	80
2.4	3.4	1.8	2.5	1.5	2.1	2.0	2.5	6.4	8.8	90	120
1.8	2.8	1.4	2.1	1.4	1.9	1.8	2.4	6.0	7.6	80	105
1.6	2.4	1.2	1.8	1.3	1.8	1.6	2.2	5.6	7.2	70	95
1.0	1.8	.8	1.3	.8	1.4	1.0	1.7	3.2	5.6	60	85
										40	60
2.0	2.6	1.5	2.0	1.2	1.7	1.6	2.2	5.2	7.2	70	100
2.0	2.6	1.5	2.0	1.2	1.7	1.6	2.1	4.8	6.8	65	95
1.6	2.2	1.2	1.7	1.0	1.4	1.4	1.9	4.0	6.0	50	80
1.8	2.4	1.3	1.8	1.1	1.5	1.5	2.0	4.4	6.4	60	90
1.2	1.8	.9	1.3	.6	1.0	.9	1.4	2.8	4.4	40	60
										30	45
1.4	2.0	1.1	1.5	.8	1.2	1.1	1.6	3.6	5.2	45	70
										30	50
										40	55
										40	60
				1.6	2.4	2.1	3.1	6.4	10.0	100	130
				1.5	2.5	2.0	3.1	6.0	10.0	95	125
				1.3	2.2	1.6	2.8	5.2	8.8	85	120
										80	105
										120	150
1.0	1.6	.8	1.2	.6	.9	.8	1.0	2.4	3.6	30	50
1.4	2.4	1.1	1.8	1.0	1.5	1.1	1.8	3.6	6.0	70	100
1.2	1.7	.9	1.6	.8	1.3	1.0	1.6	3.2	5.2	60	90
1.8	3.0	1.8	2.4	1.5	2.0	1.8	2.5	4.4	6.8	100	145
1.2	2.2	.9	1.7	.9	1.4	1.1	1.7	3.4	5.6	65	95
1.0	1.8	.8	1.3	.7	1.2	1.0	1.6	2.8	4.8	50	80
.9	1.6	.7	1.2	.6	1.0	.8	1.2	2.4	4.0	35	60
										40	60
				1.7	2.5	2.2	3.5			100	130

See footnote at end of table.

TABLE 3.—*Estimated average acre yields of specified*

[In columns A are yields under present management; in columns B are yields under improved management. Where yields

Soil	Corn		Wheat		Barley		Oats	
	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*
Urbana silt loam, 3 to 8 percent slopes, moderately eroded	40	60	17	25	25	30	----	----
Urbana silt loam, 8 to 15 percent slopes, moderately eroded	25	45	15	20	20	28	----	----
Urbana silt loam, 8 to 15 percent slopes, severely eroded	15	25	10	15	15	22	----	----
Watchung silt loam, 0 to 8 percent slopes	----	----	----	----	----	----	----	----
Wehadkee silt loam, 0 to 3 percent slopes	----	----	----	----	----	----	----	----
Wickham silt loam, 0 to 3 percent slopes	60	95	22	30	35	45	35	45
Wickham silt loam, 3 to 8 percent slopes, moderately eroded	50	85	20	28	32	42	32	42
Wickham silt loam, 8 to 15 percent slopes, moderately eroded	40	70	18	25	30	40	30	40
Worsham silt loam, 0 to 8 percent slopes	----	----	----	----	----	----	----	----

[1] The number of days 1 acre will support 1 cow, horse, or steer without injury to the pasture.

Forests of the County [1]

Less than 12 percent of the area of Montgomery County is in forest, and the acreage is gradually decreasing (*3*). In 1949 farm forest products were valued at $41,770; in 1954 they amounted to only $20,747.

It is probable that no true virgin forests remain. Most of the present forests are on rough or steep areas or on areas that have become too eroded for cultivation. Natural reforestation has produced some stands of trees, mostly scrubby hardwoods or Virginia pine in the Piedmont area and Virginia pine in the Coastal Plain area. The original forests were mostly hardwoods.

There are four general kinds of forest in the county. One kind is old-growth hardwood forest. Another is forest that has been cut over one or more times. A third kind is forest that grows in poorly drained areas, and a fourth is forest that grows where abandoned fields and pastures are reforesting naturally.

Old-growth hardwood forests.—These forests are almost entirely on large farms and estates. Their area is small. The dominant trees are white oak and red oak, but there is some yellow-poplar, locust, hickory, and black walnut.

These forests have not been exploited; their esthetic and sentimental value to their owners is greater than the value of their timber. Many of the trees are mature or overmature. Under economic forest management, these old trees should be marketed to make way for the growth of younger trees.

Cutover forests.—Most of the forests of the county are of this kind. In the Piedmont area, oak is dominant and the secondary species are hickory, elm, locust, maple, and dogwood. Virginia pine grows on some of the poorer land. On the fringe of the Coastal Plain, Virginia pine is the common species, but there is also much scrub oak. Included in this kind of forest are the farm woodlots, which vary greatly in composition and management.

Most of these cutover forests get little protection from fire or grazing. Besides timber, these forests are valuable for watershed protection and wildlife shelter.

Forests in poorly drained areas.—These forests grow in poorly drained areas on the uplands and on some of the terraces and flood plains of streams. Almost all of these areas have been cut over, but the species of trees are entirely different from those in the cutover forests of the drier areas. Pin oak and scarlet oak are the common species, but the stands include hickory, swamp maple and other maples, some elm, birch, and willow. Some areas have an undergrowth of scrubby alder, and others a nearly pure stand of alder.

These forests are of little economic importance. They furnish some fenceposts, and most of them are good wildlife shelter. Many have been thinned out so pastures could be developed, and only enough trees to provide shade for livestock have been left.

Forests in abandoned areas.—Most of these forests are in areas that have been allowed to revert to forest after they became too eroded to support crops or good pastures. Under natural revegetation, the first plants to become established are blackberry, sassafras, persimmon, hawthorn, locust, and other shrubs. In time these are followed by oak, hickory, dogwood, and other trees. In many places, particularly in the eastern and southeastern parts of the county, stands of Virginia pine have become established.

These forests should receive regular forest management. Areas that are still in the brushy stage should be replanted with profitable species of trees.

Relationship of soils and forest

Soils vary in their ability to produce trees, just as they do in their ability to produce crops. Trees grow better on the less acid soils. Soils that are no longer used for crops or pasture because they are no longer productive are likely to be less productive of trees than before they were originally cleared. Differences in elevation and climate also affect tree growth.

[1] This section was written with the assistance of A. R. BOND, assistant state forester, Maryland Department of Forests and Parks, and M. T. AUGUSTINE, plant materials specialist, Soil Conservation Service.

crops under two levels of management—Continued

are not given, either the soil is considered unsuitable for that crop or no information is available on which to base an estimate]

Alfalfa		Alfalfa and grass		Timothy and red clover		Ladino clover and orchardgrass		Sorghum and soybeans		Pasture	
A	B	A	B	A	B	A	B	A	B	A	B
Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Cow-acre-days* [1]	*Cow-acre-days* [1]
				1.5	2.5	2.0	3.4			85	115
				1.2	2.0	1.5	2.5			75	105
				.9	1.5	1.2	2.0			60	90
										80	105
										70	100
2.8	3.6	2.1	2.7	1.7	2.5	2.1	3.1	7.2	10.4	95	125
2.4	3.0	1.8	2.3	1.4	2.0	1.9	2.6	6.0	8.8	85	115
2.2	3.0	1.6	2.3	1.3	1.8	1.6	2.3	5.2	7.6	80	110
										70	100

In Montgomery County, the differences in slope, elevation, and climate are not sufficient to affect the growth of trees significantly, but the differences in soils strongly affect the natural reproduction of forest trees, particularly the germination of seed. Loose, sandy, and droughty soils are more suitable for the germination of the seed of Virginia pine than the seed of hardwood trees. As seedbeds, severely eroded soils that have much of the subsoil exposed are inferior to uneroded soils that have a friable, granular surface soil. On deep, permeable soils, the windthrow hazard is less serious than on shallower soils.

Soils affect the ease of harvesting timber and the hazards involved in logging. Some areas are too steep or too rough even for temporary roads for logging vehicles. In Montgomery County, fortunately, slopes are short, and generally logs can be skidded out by cables attached to spar trees or other supports. The forests in the county are not extensive enough to justify building permanent access or logging roads. Temporary roads should be built on the contour because most of the sloping upland soils erode readily. To prevent gullying, these roads should not be allowed to become rutted.

Trees significantly affect the soils in a forested area, especially their surface soil. Under a good stand of hardwood trees in an ungrazed upland area, there is generally a leaf litter 2 inches or more thick. This litter slows runoff and tends to keep the surface soil friable, thus allowing rainwater and snowmelt to soak in. As the litter decays or is consumed by earthworms or other biological agents, plant nutrients are added to the soil. The litter under pine trees is more acid, is lower in plant nutrients, and less affects the surface soil than the litter under hardwoods.

Reforestation

Soils that are well suited to crops and pasture are also well suited to forest, but only if the soils are no longer productive of crops or pasture would forest products have greater value.

Soils that are steep, stony, or severely eroded should be given priority in any reforestation program. They probably give greater returns from forest products than from any other use, and the trees conserve and protect the soils.

In table 4, the soils of capability classes VI and VII are grouped to show their suitability for reforestation. Class VI soils are placed in groups A–1 to A–3. Class VII soils are in groups B–1 to B–3. Each group is more or less uniform in respect to reforestation possibilities. Table 4 shows the soils within each group, the type of forest best suited to each group, the species of trees suitable for planting, and the probable feasibility of reforestation.

The information given in table 4 does not necessarily apply to spot planting in existing forests or to managing well-stocked woodlands.

Reforesting the soils in groups A–1 through A–3 would be economically justifiable. The economic returns from forests on the soils in groups A–1 and A–3 would be less than might be expected from well-managed grassland. The soils in group A–2 are very stony and are much more difficult to manage as grassland than as woodland. The returns from forest products would probably be at least equal to those from grass.

Reforesting the soils in group B–1 would be feasible. The soils in group B–2 are severely eroded and are unfavorable for the growth of seedlings. Reforesting may or may not be economically justifiable. If carefully planted, well managed, and protected from fire and grazing, these soils should in time produce good stands.

The probability of economic returns from reforesting the soils in group B–3 is very poor. Virginia pine might eventually produce enough pulpwood to justify the expense. However, reforesting these soils would provide some shelter for wildlife.

Economic returns are only part of the benefits to be derived from forests. Forests protect the headwaters of streams and reduce runoff and thus help to conserve agricultural soils, furnish shelter and food for wildlife, and provide recreational areas. Not the least of their many uses is their esthetic value in beautifying the landscape.

TABLE 4.—*Suitability of soils of capability classes VI and VII for reforestation*

Groups of soils	Forest type	Suitable species for planting	Probable feasibility [1]
Group A–1 Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded. Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded. Croom gravelly loam, 15 to 25 percent slopes, severely eroded. Croom gravelly loam, 25 to 45 percent slopes, moderately eroded. Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded. Glenelg silt loam, 15 to 25 percent slopes, severely eroded. Glenelg soils, 25 to 45 percent slopes, moderately eroded. Legore silt loam, 15 to 25 percent slopes, severely eroded. Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded. Manor channery silt loam, 15 to 25 percent slopes, severely eroded. Manor channery silt loam, 25 to 45 percent slopes, moderately eroded. Manor silt loam, 15 to 25 percent slopes, severely eroded. Manor silt loam, 25 to 45 percent slopes, moderately eroded. Manor soils, 8 to 15 percent slopes, very severely eroded. Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded. Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded. Penn silt loam, 8 to 15 percent slopes, very severely eroded. Penn silt loam, 15 to 25 percent slopes, severely eroded. Penn silt loam, 25 to 45 percent slopes, moderately eroded.	Upland conifer and/or hardwood.	Virginia pine, loblolly pine, red pine, white pine, Scotch pine, tulip-poplar, and black locust.	Fairly good to good; economic returns probably will justify but may not be as great as from grassland.
Group A–2 Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded. Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded. Stony land, Manor materials, 3 to 15 percent slopes.	Upland conifer and/or hardwood.	Virginia pine, loblolly pine, red pine, white pine, Scotch pine, tulip-poplar, and black locust.	Very good; economic returns will justify and should be at least as great as from grassland.
Group A–3 Bowmansville silt loam, 0 to 3 percent slopes. Mixed alluvial land. Wehadkee silt loam, 0 to 3 percent slopes.	Wetland conifer	Loblolly pine	Good; economic returns should justify but probably will not be as great as from grassland.
Group B–1 Manor soils, 45 to 65 percent slopes. Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded. Penn soils, 45 to 65 percent slopes. Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded. Stony land, Manor materials, 15 to 45 percent slopes.	Upland conifer and/or hardwood.	Virginia pine, loblolly pine, red pine, white pine, Scotch pine, tulip-poplar, and black locust.	Good; economic returns should justify and will be greater than from grassland.

See footnote at end of table.

TABLE 4.—*Suitability of soils of capability classes VI and VII for reforestation*—Continued

Groups of soils	Forest type	Suitable species for planting	Probable feasibility [1]
Group B–2 Brandywine loam, 15 to 25 percent slopes, severely eroded. Glenelg soils, 25 to 45 percent slopes, severely eroded. Gullied land, Penn materials. Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded. Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded. Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded. Manor channery silt loam, 25 to 45 percent slopes, severely eroded. Manor soils, 15 to 25 percent slopes, very severely eroded. Manor soils, 25 to 45 percent slopes, severely eroded.	Upland conifer and/or hardwood.	Virginia pine, loblolly pine, red pine, white pine, Scotch pine, tulip-poplar, and black locust.	Poor; economic returns may or may not justify but should be greater than from grassland.
Group B–3 Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded. Croom gravelly loam, 25 to 45 percent slopes, severely eroded. Lakeland loamy sand, 15 to 25 percent slopes, severely eroded.	Upland conifer	Virginia pine	Very poor; economic returns probably will not justify.

[1] For suggested species only.

Engineering Uses of Soils [2]

This soil survey report contains information that can be used by engineers to—

1. Make soil and land-use studies that will aid in the selection and development of industrial, business, residential, and recreational sites.
2. Make preliminary estimates of runoff and erosion for use in designing drainage structures and planning dams and other structures for water and soil conservation.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting highway and airport locations and in planning detailed soil surveys for the intended locations.
4. Locate sand and gravel for use in structures, rock for crushing, and building stone.
5. Correlate performance of engineering structures with soil mapping units and thus develop information that will be useful in designing and maintaining the structures.
6. Determine the suitability of soil units for cross-country movements of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs for the purpose of making soil maps and reports that can be readily used by engineers.

The mapping and descriptive reports are somewhat generalized, however, and should be used only in planning more detailed field surveys to determine the in-place condition of the soil at the site of the proposed engineering construction.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand, aggregate, and granular—have special meanings in soil science. Most of these terms, as well as other special terms that are used in the soil survey report, are defined in the Glossary at the back of this report.

Engineering descriptions and physical properties

Table 5 describes, for each series of soils in Montgomery County, the soil properties that are significant in engineering and gives the estimated engineering classifications of the soils according to the AASHO system and according to the Unified system.

The AASHO (American Association of State Highway Officials) system of classification (*1*) is the one most commonly used by highway engineers. In this system, soil materials are classified in seven principal groups. The groups range from A–1, consisting of gravelly soils of high bearing capacity, to A–7, consisting of clay soils having low strength when wet.

Some engineers prefer the Unified soil classification system (*13*). In this system, soil materials are identified as coarse grained (8 classes), fine grained (6 classes), or highly organic.

The descriptions in table 5 are of nonstony, practically uneroded soils, but comments on the effects of erosion, stoniness, gravel content, and other characteristics are included.

[2] This section was prepared with the assistance of KENDALL P. JARVIS, state conservation engineer for Maryland, Soil Conservation Service.

TABLE 5.—*Brief description of soils*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
AdA	Aldino silt loam, 0 to 3 percent slopes.	3	4	Somewhat poorly drained to moderately well drained upland soils that developed in residuum weathered from serpentine; highly dispersed, dense fragipan. In the severely eroded soil the fragipan is at or very near the surface and some deep gullies have formed.	0 to 5	Silt loam
AdB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded.	3	4		5 to 11	Silt loam
AdC2	Aldino silt loam, 8 to 15 percent slopes, moderately eroded.	3	4		11 to 28	Silty clay
AdC3	Aldino silt loam, 8 to 15 percent slopes, severely eroded.	[1] 1 to 2	2 to 3		28 to 36+	Sandy clay loam.
AsA	Ashton silt loam, 0 to 3 percent slopes.	4	[2]	Well-drained, deep soils on low terraces; developed in old alluvium derived from limestone. Subject to infrequent flooding.	0 to 14	Silt loam
AsB2	Ashton silt loam, 3 to 8 percent slopes, moderately eroded.	4	[2]		14 to 40	Silty clay loam.
					40 to 60+	Gravelly silty clay loam.
BaA2	Beltsville silt loam, 0 to 3 percent slopes, moderately eroded.	[1] 1 to 2	[2]	Moderately well drained upland soils that developed in a silty mantle over outwash sand and gravel on the upper Coastal Plain; highly developed fragipan.	0 to 13	Silt loam
BaB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded.	[1] 1 to 2	[2]		13 to 21	Silty clay loam.
					21 to 48	Clay loam
BaC2	Beltsville silt loam, 8 to 15 percent slopes, moderately eroded.	[1] 1 to 2	[2]		48 to 54+	Silty clay loam.
BeA	Bermudian silt loam, 0 to 3 percent slopes.	4	[2]	Well-drained, deep soils on flood plains; developed in alluvium derived from red shale and sandstone. Subject to occasional flooding.	0 to 12	Silt loam
BeB	Bermudian silt loam, 3 to 8 percent slopes.	4	[2]		12 to 72+	Silt loam
BoA	Bowmansville silt loam, 0 to 3 percent slopes.	0 to 1	[2]	Poorly drained soil on flood plains; developed in alluvium derived from red shale and sandstone. Frequently flooded.	0 to 18	Silt loam
					18 to 48+	Silty clay loam.
					----------	Gravelly sandy loam.
BrC2	Brandywine loam, 3 to 15 percent slopes, moderately eroded.	[3]	1 to 2	Excessively drained, very shallow upland soils that developed in residuum derived from gneiss; bedrock may be deep under thick C horizon. In the severely eroded soils, from 5 to 10 inches of original soil has been lost through erosion; former C horizon is at or near the surface; some gullies are deep to bedrock.	0 to 5	Loam
					5 to 10	Gravelly loam
BrC3	Brandywine loam, 3 to 15 percent slopes, severely eroded.	[3]	1		10 to 15	Gravelly loam
					15+	----------
BrD2	Brandywine loam, 15 to 25 percent slopes, moderately eroded.	[3]	1 to 2			
BrD3	Brandywine loam, 15 to 25 percent slopes, severely eroded.	[3]	1			
BuA	Bucks silt loam, 0 to 3 percent slopes.	4+	4 to 5	Well-drained, deep upland soils that developed in residuum derived from red shale and sandstone. The severely eroded soils have lost from 6 to 12 inches or more of original surface soil; many gullies, some to bedrock.	0 to 12	Silt loam
BuA2	Bucks silt loam, 0 to 3 percent slopes, moderately eroded.	4+	4 to 5		12 to 23	Silty clay loam.
					23 to 33	Loam
BuB2	Bucks silt loam, 3 to 8 percent slopes, moderately eroded.	4+	4 to 5		33 to 40+	Gravelly loam
BuB3	Bucks silt loam, 3 to 8 percent slopes, severely eroded.	3+	2 to 4			
BuC3	Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded.	3+	2 to 4			
CaB	Calvert silt loam, 0 to 8 percent slopes.	0 to 1	2 to 4	Poorly drained soil in draws and depressions; developed in residuum weathered from serpentine; some colluvial surface material. Very wet; water occasionally stands on this soil.	0 to 9	Silt loam
					9 to 18	Silty clay to clay.
					18 to 20	----------
					20+	----------
CoA	Captina silt loam, 0 to 3 percent slopes.	[1] 3 to 4	[2]	Moderately well drained soils on high terraces; developed in old	0 to 7	Silt loam

See footnotes at end of table.

and their estimated physical properties

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A-4	70	100	100	0.63 to 2.0	Granular to subangular blocky.	5.1 to 5.5	Moderate	Low.
ML	A-4	80	100	100	.20 to 0.63	Platy	5.6 to 6.0	High	Low.
CL	A-6	80	100	100	.06 to 0.20	Platy	5.6 to 6.0	High	Moderate.
SC	A-2	30	80	90	.63 to 2.0	Massive	6.6 to 7.3		Low.
ML	A-4	70	90	95	.63 to 2.0	Granular to subangular blocky.	6.1 to 6.5	High	Low.
ML or CL	A-6	80	90	95	.20 to 2.0	Subangular blocky	5.1 to 6.5	Moderate	Low.
GM or GC	A-2	30	35	45	.63 to 2.0	Blocky to subangular blocky.	5.1 to 5.5	Moderate	Low.
ML	A-4	65	95	100	.63 to 2.0	Crumb to subangular blocky.	5.1 to 5.5	High	Low.
ML or CL	A-4 or A-6	65	85	95	.20 to 0.63	Subangular blocky	5.1 to 5.5	Moderate	Low.
CL	A-6	75	85	95	<0.06	Platy and blocky	5.1 to 5.5	High	Moderate.
ML or CL	A-4 or A-6	65	80	90	.20 to 0.63	Massive	5.1 or 5.5		Low.
ML	A-4	85	100	100	.63 to 2.0	Weak platy	5.6 to 6.0	High	Low.
ML or CL	A-4	85	95	100	.63 to 2.0	Subangular blocky	5.1 to 6.0	High	Low.
ML	A-4	70	100	100	.63 to 2.0	Subangular blocky	5.6 to 6.0	High	Low.
ML or CL	A-6	75	100	100	.63 to 2.0	Blocky	5.1 to 5.5	Moderate	Low.
GM	A-2								Low.
SM	A-2	35	80	95	2.0 to 6.3	Granular to blocky	5.1 to 5.5	High	Low.
SM or GM	A-2	25	60	80	2.0 to 6.3	Subangular blocky	5.1 to 5.5	High	Low.
GM or GC	A-1	10	25	45	2.0 to 6.3	None	5.6 to 6.0	High	Low.
						(Hard gneiss)			
ML	A-4	75	100	100	.63 to 2.0	Granular to platy	5.1 to 6.5	High	Low.
ML or CL	A-4 or A-5	85	100	100	.20 to 0.63	Subangular blocky	4.5 to 5.0	Moderate	Moderate.
SM or SC	A-2 or A-4	35	75	90	.63 to 2.0	Subangular blocky	4.5 to 5.0	Moderate	Low.
GM or GC	A-2	15	30	50	.63 to 2.0	None	5.1 to 5.5		
ML	A-4	75	100	100	.20 to 0.63	Granular to platy	5.1 to 5.5	High	Low.
CH	A-7	85	100	100	.06 to 0.20	Blocky	5.6 to 6.0	Low	Moderate.
						(Weathered serpentine schist).			
						(Serpentine schist)			
ML	A-4	75	95	100	.63 to 2.0	Crumb to subangular blocky.	6.1 to 7.3	Moderate	Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
CbB2	Captina silt loam, 3 to 8 percent slopes, moderately eroded.	[1] 3 to 4	[2]	alluvium derived from limestone; fragipan at depth of 22 inches or more. Underlain at 54 inches or more by silty to clayey gravel.	7 to 22 22 to 48+	Silt loam Silty clay loam.
ChA	Chester silt loam, 0 to 3 percent slopes.	[3]	4 to 10	Deep, well-drained upland soils that developed in residuum	0 to 8	Silt loam
ChA2	Chester silt loam, 0 to 3 percent slopes, moderately eroded.	[3]	4 to 10	weathered from mica schist. The severely eroded soils have	8 to 40	Silty clay loam.
ChB2	Chester silt loam, 3 to 8 percent slopes, moderately eroded.	[3]	4 to 10	lost most, and in places all, of the original surface soil and	40 to 48+	Loam
ChB3	Chester silt loam, 3 to 8 percent slopes, severely eroded.	[3]	2 to 8	some subsoil through erosion; the C horizon is within 1 to 3		
ChC2	Chester silt loam, 8 to 15 percent slopes, moderately eroded.	[3]	4 to 10	feet of the surface; a few gullies to parent material.		
ChC3	Chester silt loam, 8 to 15 percent slopes, severely eroded.	[3]	2 to 8			
CkA	Chewacla silt loam, 0 to 3 percent slopes.	1 to 2	[2]	Moderately well drained floodplain soil that developed in alluvium derived from crystalline rocks. Clayey sand or gravel at depths of 5 feet or more. Fairly frequently flooded.	0 to 18 18 to 20 20 to 48 +	Silt loam Silt loam Silty clay
ClB2	Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded.	4+	[2]	Well-drained, moderately deep to deep upland soils that developed	0 to 8 8 to 13	Silt loam Silt loam
ClB3	Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded.	4+	[2]	in a silty mantle over outwash sand and gravel of the upper Coastal Plain. Upper part of	13 to 26 26 to 48+	Silty clay loam. Gravelly sandy loam.
ClC2	Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded.	4+	[2]	substratum is cemented and very slowly permeable. The		
ClC3	Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded.	4+	[2]	surface soil and subsoil of the gravelly silt loams are about 20 percent rounded gravel. The		
ClD2	Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded.	4+	[2]	severely eroded gravelly silt loams have lost most, and in places all, of the original surface		
ClE2	Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded.	4+	[2]	soil, and the subsoil is exposed; these soils are shallower to the cemented substratum; a few		
CmB2	Chillum silt loam, 3 to 8 percent slopes, moderately eroded.	4+	[2]	shallow gullies. The undifferentiated mapping units consist of Chillum gravelly silt loam		
CmC2	Chillum silt loam, 8 to 15 percent slopes, moderately eroded.	4+	[2]	interspersed with Penn gravelly silt loam; soils are like the Chillum soils in physical properties		
CmD2	Chillum silt loam, 15 to 25 percent slopes, moderately eroded.	4+	[2]	but like the Penn soils in color; generally more nearly like Chillum gravelly silt loam than like		
CnB2	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded.	4+	[4]	the Penn soils.		
CnB3	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded.	4+	[4]			
CnC2	Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded.	4+	[4]			
CnD3	Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded.	4+	[4]			
CoC2	Chrome silt loam, 8 to 15 percent slopes, moderately eroded.	[3]	2 to 3	Well-drained, very shallow upland soils that developed in residuum	0 to 8 8 to 12	Silt loam Silty clay
CpD2	Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded.	[3]	2 to 3	weathered from serpentine. Stony phase contains many stones and boulders. The un-	12 to 24 24+	Gravelly silty clay.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A–4	70	90	95	0. 63 to 2. 0	Subangular blocky	5. 6 to 6. 0	Moderate	Low.
CL	A–6	75	90	95	. 06 to 0. 20	Platy	5. 6 to 6. 0	High	Low.
ML	A–4	65	95	98	. 63 to 2. 0	Granular to subangular blocky.	4. 5 to 5. 5	High	Low.
CL	A–6	75	90	95	. 20 to 0. 63	Subangular blocky	4. 5 to 5. 5	Low to moderate.	Moderate.
SC	A–2 or A–4	35	55	70	. 63 to 2. 0	None	5. 1 to 5. 5		Low.
ML	A–4	75	100	100	. 20 to 2. 0	Crumb to platy	4. 5 to 5. 5	High	Low.
ML	A–4	75	100	100	. 20 to 0. 63	Platy	4. 5 to 5. 0	High	Low.
CL	A–6	85	100	100	. 20 to 0. 63	Platy and blocky	4. 5 to 5. 0	High	Moderate.
ML	A–4	65	95	100	. 63 to 2. 0	Granular	5. 1 to 5. 5	High	Low.
ML	A–4	70	95	100	. 63 to 2. 0	Granular and subangular blocky.	4. 5 to 5. 0	High	Low.
ML or CL	A–6	70	90	95	. 63 to 2. 0	Subangular blocky	5. 1 to 5. 5	Moderate	Low.
GM	A–2	15	30	45	. 06 to 2. 0	Massive; upper part cemented.	4. 5 to 5. 0		Low.
ML	A–4	80	100	100	. 20 to 0. 63	Granular to subangular blocky.	5. 1 to 5. 5	High	Low.
CH	A–7	85	100	100	. 02 to 0. 06	Blocky	4. 5 to 5. 0	Moderate	Moderate.
GC or CH	A–2 or A–7	30	35	40	. 02 to 0. 06	Blocky (Serpentine rock)	5. 1 to 5. 5	Moderate	Moderate.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
CrB2	Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded.	(3)	2 to 4	differentiated areas are mixed Chrome and Conowingo silt loams and intergrades between these two soils.		
CrB3	Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded.	(3)	2 to 4			
CtA	Congaree silt loam, 0 to 3 percent slopes.	4	(2)	Well-drained, deep, flood-plain soil that developed in alluvium derived from crystalline rocks. Subject to occasional flooding.	0 to 6 6 to 36 36 to 60+	Silt loam Silt loam Gravelly silt loam.
CvA2	Conowingo silt loam, 0 to 3 percent slopes, moderately eroded.	(3)	3 to 4	Moderately well drained upland soils that developed in residuum weathered from serpentine. The severely eroded soils have lost most, and in places all, of the original surface soil through erosion; a few gullies to bedrock.	0 to 9 9 to 36 36+	Silt loam Silty clay loam. Gravelly sandy clay.
CvA3	Conowingo silt loam, 0 to 3 percent slopes, severely eroded.	(3)	2 to 4			
CwB2	Croom gravelly loam, 3 to 8 percent slopes, moderately eroded.	4+	(2)	Somewhat excessively drained upland soils that developed on outwash sand and gravel of upper Coastal Plain. The severely eroded soils have lost most of the original surface soil; cemented subsoil very near surface or exposed; a few shallow gullies.	0 to 12 12 to 28 28 to 120+	Gravelly loam Very gravelly sandy clay loam. Gravel
CwC2	Croom gravelly loam, 8 to 15 percent slopes, moderately eroded.	4+	(2)			
CwC3	Croom gravelly loam, 8 to 15 percent slopes, severely eroded.	4+	(2)			
CwD2	Croom gravelly loam, 15 to 25 percent slopes, moderately eroded.	4+	(2)			
CwD3	Croom gravelly loam, 15 to 25 percent slopes, severely eroded.	4+	(2)			
CwE2	Croom gravelly loam, 25 to 45 percent slopes, moderately eroded.	4+	(2)			
CwE3	Croom gravelly loam, 25 to 45 percent slopes, severely eroded.	4+	(2)			
CxA	Croton silt loam, 0 to 8 percent slopes.	1 to 2	4+	Poorly drained soil in draws and depressions and on upland flats; developed from residuum derived from red shale or sandstone; some colluvial surface material. Seepage spots common.	0 to 6 6 to 36 36 to 48 48+	Silt loam Clay loam Silty clay loam.
EdB2	Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.	(3)	3 to 5	Well-drained upland soils that developed in residuum weathered from quartzite. The severely eroded soil has lost most, and in places all, of the original surface soil; subsoil is very near surface or exposed.	0 to 12 12 to 25 25 to 36+	Gravelly sandy loam. Gravelly sandy clay loam. Gravelly loam.
EdC3	Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded.	(3)	1 to 4			
EeA	Elioak silt loam, 0 to 3 percent slopes.	(3)	5 to 10	Well-drained, deep upland soils that developed in residuum weathered from mica schist, very strongly oxidized. The severely eroded soils have lost most or all of the original surface soil; the subsoil is exposed or mixed into the plow layer.	0 to 8 8 to 44 44 to 96+	Silt loam Silty clay loam. Silt loam
EeB2	Elioak silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	5 to 10			
EeC2	Elioak silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	5 to 10			
EkB3	Elioak silty clay loam, 3 to 8 percent slopes, severely eroded.	(3)	3 to 8			
EkC3	Elioak silty clay loam, 8 to 15 percent slopes, severely eroded.	(3)	3 to 8			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A-4	75	100	100	0.63 to 2.0	Granular	5.6 to 6.0	Moderate	Low.
ML	A-4	60	100	100	.63 to 2.0	Weak platy	5.1 to 5.5	High	Low.
GM or GC	A-2	25	35	45	2.0 to 6.3	Subangular blocky	5.1 to 5.5	Moderate	Low.
ML	A-4	70	100	100	.20 to 0.63	Granular	5.1 to 5.5	Moderate	Low.
CL or CH	A-6 or A-7	80	100	100	.02 to 0.20	Blocky	4.5 to 5.5	Moderate	Moderate.
GC	A-2	20	35	40	.02 to 0.06	(Serpentine)	4.5 to 5.5		
GM or SM	A-2	20	40	55	2.0 to 6.3	Granular to blocky	4.5 to 5.5	High	Low.
GM	A-2	20	30	45	.20 to 0.63	Cemented	4.5 to 5.0	Low	Low.
GP	A-1	5	15	25	>6.3	None	4.5 to 5.0		
ML	A-4	75	100	100	.63 to 2.0	Crumb to subangular blocky.	5.1 to 5.5	High	Low.
CL or CH	A-6 or A-7	85	100	100	.06 to 0.20	Blocky to platy	4.5 to 5.0	Moderate	Moderate.
CL	A-6	75	90	100	.20 to 0.63	None	5.1 to 5.5		Moderate.
						(Shale, sandstone)			
SM	A-2	20	45	70	2.0 to 6.3	Single grain to subangular blocky.	4.0 to 5.0	High	Low.
SC or GC	A-2	30	50	65	.63 to 2.0	Subangular blocky	4.5 to 5.0	High	Low.
GM	A-2	15	25	40	.63 to 2.0	None	4.5 to 5.0		Low.
ML	A-4	70	95	98	.63 to 2.0	Subangular blocky	5.6 to 6.5	Moderate	Low.
CL or ML	A-6 or A-4	80	90	95	.20 to 0.63	Blocky and subangular blocky.	5.1 to 6.0	Moderate	Moderate.
ML	A-5	80	90	95	.20 to 0.63	Blocky and platy	5.1 to 6.0	Moderate	Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
ElA2	Elk silt loam, 0 to 3 percent slopes, moderately eroded.	4	(2)	Well-drained, deep soils on high terraces; developed in very old alluvium derived from limestone. The severely eroded soil has lost most, and in places all, of the original surface soil and some subsoil. In places the former subsoil is mixed into the plow layer.	0 to 9	Silt loam
					9 to 16	Silt loam
ElB2	Elk silt loam, 3 to 8 percent slopes, moderately eroded.	4	(2)		16 to 58	Silty clay loam.
EmC3	Elk silty clay loam, 8 to 15 percent slopes, severely eroded.	3 to 4	(2)		58 to 72+	Fine sandy loam.
Ep	Eroded land, Penn materials	(3)	0 to 2	Very severely eroded areas that originally were Penn silt loam or other soils of the Penn series. Very shallow; in many places bedrock is exposed.	0 to 12	Channery silt loam.
					12+	
GcB2	Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	5+	Well-drained, shallow to moderately deep upland soils that developed in residuum weathered from soft mica schist, granitized schist, or gneiss. Gravelly areas near Coastal Plain have waterworn pebbles on and near the surface. Included with the Glenelg soils, 25 to 45 percent slopes, moderately eroded, are areas of Chester or Elioak silt loams. The severely eroded soils have lost most, and in places all, of the original surface soil and the subsoil is very near the surface or exposed; a few shallow gullies. The moderately eroded channery silt loams have much hardschist skeletal material in the solum and are shallower to bedrock; subsoil is ML grading toward GC, and substratum is ML grading toward GP. The severely eroded channery silt loams have lost most, and in places all, of the original surface soil; a few to many gullies have cut into the parent material and a few to bedrock.	0 to 12	Silt loam
GcB3	Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded.	(3)	4+		12 to 24	Silty clay loam.
GcC2	Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	5+		24 to 48+	Loam
GcC3	Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded.	(3)	4+			
GcD2	Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	5+			
GcD3	Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded.	(3)	4+			
GgB2	Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded.	(3)	5 to 10+			
GgB3	Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded.	(3)	3 to 10+			
GgC2	Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded.	(3)	5 to 10+			
GgC3	Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded.	(3)	3 to 10+			
GgD2	Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded.	(3)	5 to 10+			
GhA	Glenelg silt loam, 0 to 3 percent slopes.	(3)	5 to 10+			
GhB2	Glenelg silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	5 to 10+			
GhB3	Glenelg silt loam, 3 to 8 percent slopes, severely eroded.	(3)	3 to 10+			
GhC2	Glenelg silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	5 to 10+			
GhC3	Glenelg silt loam, 8 to 15 percent slopes, severely eroded.	(3)	3 to 10+			
GhD2	Glenelg silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	5 to 10+			
GhD3	Glenelg silt loam, 15 to 25 percent slopes, severely eroded.	(3)	3 to 10+			
GlE2	Glenelg soils, 25 to 45 percent slopes, moderately eroded.	(3)	4 to 10			
GlE3	Glenelg soils, 25 to 45 percent slopes, severely eroded.	(3)	3 to 10+			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A–4	70	85	95	0. 63 to 2. 0	Granular	5. 6 to 5. 0	Moderate	Low.
ML	A–4	70	85	95	. 20 to 0. 63	Subangular blocky and platy.	5. 1 to 5. 5	High	Low.
CL or ML	A–6	75	90	95	. 20 to 0. 63	Blocky to weak platy	4. 5 to 5. 5	Moderate	Moderate.
SM	A–2	30	75	90	. 63 to 2. 0	Platy	4. 5 to 5. 0	High	Low.
ML or GM	A–2 or A–4	35	50	60	. 20 to 2. 0	Subangular blocky	4. 5 to 5. 0	High	Low.
GM or GC	A–2	15	20	30		(Fractured shale)			
ML	A–4	65	95	98	. 63 to 2. 0	Granular to subangular blocky.	4. 5 to 5. 5	High	Low.
CL or ML	A–6	75	90	95	. 20 to 2. 0	Subangular blocky	4. 5 to 5. 0	Moderate	Low.
MH	A–5	70	90	95	. 63 to 2. 0	Massive	5. 1 to 5. 5	High	Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
GmA	Glenville silt loam, 0 to 3 percent slopes.	[1] 1 to 3	4+	Moderately well drained soils in draws and depressions and upland flats; developed in residuum weathered from crystalline rocks; some colluvial surface material. Seepage spots fairly common. Fragipan in subsoil.	0 to 5	Silt loam
GmB	Glenville silt loam, 3 to 8 percent slopes.	[1] 1 to 3	4+		5 to 28	Silt loam
GmB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded.	[1] 1 to 3	4+		28 to 42+	Silt loam
Gr	Gullied land, Penn materials	([3])	0 to 2	Very severely eroded areas that originally were Penn silt loam or undetermined soils of the Penn series; very shallow; in many places bedrock is exposed.	0 to 10 10+	Channery silt loam. ----------
HaA	Huntington silt loam, 0 to 3 percent slopes.	3	([2])	Well-drained, deep soils on flood plains; developed in alluvium derived from limestone. Infrequently flooded.	0 to 12 12 to 60+	Silt loam Silt loam
HaB2	Huntington silt loam, 3 to 8 percent slopes, moderately eroded.	3	([2])			
IdA	Iredell silt loam, 0 to 3 percent slopes.	([3])	4	Moderately well drained upland soils that developed in residuum weathered from basic rocks. The severely eroded soil has lost most, and in places all, of the original surface soil, and the subsoil is mixed with remaining surface soil.	0 to 8 8 to 28 28 to 36+	Silt loam Clay loam to clay. Loam
IdB2	Iredell silt loam, 3 to 8 percent slopes, moderately eroded.	([3])	4			
IeC3	Iredell silty clay loam, 3 to 15 percent slopes, severely eroded.	([3])	1 to 3			
LaC2	Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded.	6+	([2])	Somewhat excessively drained, deep, very sandy upland soils that developed on coastal-plain sand, probably deposited or reworked by wind. The severely eroded soil has lost most, and in places all, of the original surface soil; mechanical properties not affected.	0 to 16 16 to 34 34 to 56 56 to 60+	Loamy sand Sand Loamy sand to sand. Sand
LaD3	Lakeland loamy sand, 15 to 25 percent slopes, severely eroded.	6+	([2])			
LeB2	Legore silt loam, 3 to 8 percent slopes, moderately eroded.	([3])	4	Well-drained, shallow to moderately deep upland soils that developed in residuum weathered from basic rocks. The severely eroded soils have lost most or all of the original surface soil; a few to many gullies, mostly shallow.	0 to 6 6 to 12 12 to 20 20 to 36+	Silt loam Silt loam Clay Clay
LeB3	Legore silt loam, 3 to 8 percent slopes, severely eroded.	([3])	1 to 3			
LeC2	Legore silt loam, 8 to 15 percent slopes, moderately eroded.	([3])	4			
LeC3	Legore silt loam, 8 to 15 percent slopes, severely eroded.	([3])	1 to 3			
LeD3	Legore silt loam, 15 to 25 percent slopes, severely eroded.	([3])	1 to 3			
LgA2	Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded.	[1] 1 to 2	([2])	Somewhat poorly drained upland soils that developed in a silty mantle over outwash sand and gravel of the upper Coastal Plain. Slowly permeable fragipan in subsoil.	0 to 8 8 to 12 12 to 29 29 to 36+	Silt loam Silt loam Silty clay loam. Clay loam
LgB2	Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded.	[1] 1 to 2	([2])			
LhA2	Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded.	([3])	3	Excessively drained, shallow upland soils that developed in residuum weathered from red sandstone. Good stability and bearing values. The severely eroded soils have lost part, and in places all, of the original surface soil, and the subsoil is very near the surface or is exposed; a few to many gullies, some to bedrock.	0 to 19 19 to 30+	Sandy loam Gravelly coarse sandy loam.
LhB2	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded.	([3])	3			
LhB3	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded.	([3])	1 to 2			
LhC2	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded.	([3])	3			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A–4	65	90	95	0.63 to 2.0	Granular to subangular blocky.	4.5 to 5.5	Moderate	Low.
ML or CL	A–4 or A–6	70	95	98	.06 to 2.0	Platy and subangular blocky.	4.5 to 5.0	High	Low.
MH	A–5	65	85	90	.20 to 0.63	Subangular blocky	4.5 to 5.0	High	Low.
ML or GM	A–2 or A–4	35	50	60	.20 to 2.0	Subangular blocky	4.5 to 5.0	High	Low.
GM or GC	A–2	15	20	30		(Fractured shale)			
ML	A–4	80	100	100	.63 to 2.0	Granular to platy	6.1 to 6.5	Moderate	Low.
ML or CL	A–4 or A–6	90	100	100	.20 to 0.63	Blocky and subangular blocky.	6.1 to 7.4	Moderate	Low to moderate.
ML	A–4	80	100	100	.20 to 0.63	Crumb to platy	5.6 to 6.0	High	Low.
CH	A–7	90	100	100	.02 to 0.06	Blocky	6.1 to 7.4	Moderate	High.
SC	A–6	45	80	100	.20 to 0.63	None	7.4 to 7.8	High	Moderate.
SP–SM	A–3	10	100	100	>6.3	None	5.1 to 5.5	High	Very low.
SP	A–3	5	98	99	>6.3	None	4.5 to 5.0	High	None.
SP–SM	A–3	8	95	98	>6.3	None	4.5 to 5.0	High	Very low.
SP	A–3	2	95	98	>6.3	None	4.5 to 5.0	High	None.
ML	A–4	70	90	95	.63 to 2.0	Granular	5.6 to 6.0	High	Low.
ML or CL	A–6	75	90	95	.20 to 0.63	Subangular blocky	5.6 to 6.0	High	Moderate.
CH	A–7	80	95	98	.20 to 0.63	Blocky	6.1 to 6.5	Moderate	High.
CH	A–7	65	80	90	.06 to 0.20	Massive	6.6 to 7.3		High.
ML	A–4	65	95	100	.63 to 2.0	Crumb	5.6 to 6.0	Low	Low.
ML	A–4	65	90	95	.20 to 0.63	Subangular blocky	5.1 to 5.5	Moderate	Low.
ML or MH	A–6 or A–7	65	75	90	.02 to 0.06	Platy and blocky	4.5 to 5.0	High	Moderate.
CL or CH	A–7	70	80	90	.02 to 0.06	Platy	4.5 to 5.0	High	Moderate.
SM	A–2	30	80	95	2.0 to 6.3	Granular to blocky	5.1 to 5.5	High	Low.
GM	A–2	10	30	50	2.0 to 6.3	None	5.1 to 5.5		Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
LhC3	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded.	(3)	1 to 2			
LhD2	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded.	(3)	3			
LhD3	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded.	(3)	1 to 2			
LhE3	Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded.	(3)	1 to 2			
LnA	Lindside silt loam, 0 to 3 percent slopes.	1 to 2	(3)	Moderately well drained soils on the flood plains; developed in alluvium derived from limestone. Occasionally flooded.	0 to 4 4 to 18 18 to 48+	Silt loam Silt loam Silt loam
LoB2	Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	2	Well drained to excessively drained, shallow upland soils that developed in residuum derived from hard, phyllitic schist and that contain much skeletal material. The severely eroded soils have lost most, and in places all, of the original surface soil, and the subsoil is mixed with any remaining surface soil; a few to many gullies, some to bedrock.	0 to 6	Channery silt loam.
LoC2	Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	2		6 to 20	Channery silty clay.
LoD2	Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	2		20 to 24	Very channery silty clay.
LrB3	Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded.	(3)	1		24+	
LrC3	Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded.	(3)	1			
LrD3	Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded.	(3)	1			
LrE3	Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded.	(3)	1			
McB2	Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	2 to 6	The channery silt loams are somewhat excessively drained, shallow upland soils that developed in residuum weathered from hard schist; much skeletal material that increases in coarseness with depth. The severely eroded channery silt loams have lost most, and in places all, of the original surface soil; a few to many gullies, some to bedrock. The silt loams developed in residuum from softer schist and are nearly free of skeletal material; the saprolite is weathered to much greater depth; ML to about 9 inches, then ML to MH to bedrock. The severely eroded silt loams have lost most, and in places all, of the original surface soil; a few shallow to deep gullies. In the very severely eroded soils, highly micaceous parent material is exposed, and a few deep gullies have formed; bedrock is exposed in some places.	0 to 7	Channery silt loam.
McB3	Manor channery silt loam, 3 to 8 percent slopes, severely eroded.	(3)	1 to 4		7 to 18	Channery silty clay loam.
McC2	Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	2 to 6		18 to 36+	Channery silty clay loam.
McC3	Manor channery silt loam, 8 to 15 percent slopes, severely eroded.	(3)	1 to 4			
McD2	Manor channery silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	2 to 6			
McD3	Manor channery silt loam, 15 to 25 percent slopes, severely eroded.	(3)	1 to 4			
McE2	Manor channery silt loam, 25 to 45 percent slopes, moderately eroded.	(3)	2 to 6			
McE3	Manor channery silt loam, 25 to 45 percent slopes, severely eroded.	(3)	1 to 4			
MdB2	Manor silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	6 to 12			
MdB3	Manor silt loam, 3 to 8 percent slopes, severely eroded.	(3)	5 to 10			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—				Selected characteristics significant in engineering			
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A-4	75	100	100	0.63 to 2.0	Granular	6.1 to 6.5	High	Low.
ML	A-4	75	100	100	.63 to 2.0	Subangular blocky	6.1 to 6.5	High	Low.
ML or CL	A-6	80	100	100	.20 to 0.63	Blocky and platy	6.6 to 7.3	Moderate	Moderate.
ML	A-4	45	60	80	.63 to 2.0	Crumb to subangular blocky.	4.5 to 5.5	Moderate	Low.
CL	A-6	50	60	75	.20 to 0.63	Subangular blocky	4.5 to 5.0	Moderate	Low.
GM or GC	A-2	20	30	40	.63 to 2.0	Laminated	5.1 to 5.5	High	Low.
						(Hard phyllite)			
ML	A-4	40	60	70	.63 to 2.0	Granular to subangular blocky.	5.1 to 5.5	High	Low.
GM	A-2 or A-5	35	45	50	.63 to 2.0	Blocky and subangular blocky.	4.5 to 5.0	Moderate	Low.
GM	A-2 or A-5	20	30	45	.20 to 2.0	Massive	4.5 to 5.0		Low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
MdC2	Manor silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	6 to 12			
MdC3	Manor silt loam, 8 to 15 percent slopes, severely eroded.	(3)	5 to 10			
MdD2	Manor silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	6 to 12			
MdD3	Manor silt loam, 15 to 25 percent slopes, severely eroded.	(3)	5 to 10			
MdE2	Manor silt loam, 25 to 45 percent slopes, moderately eroded.	(3)	6 to 12			
MeC4	Manor soils, 8 to 15 percent slopes, very severely eroded.	(3)	0 to 6			
MeD4	Manor soils, 15 to 25 percent slopes, very severely eroded.	(3)	0 to 6			
MeE3	Manor soils, 25 to 45 percent slopes, severely eroded.	(3)	5 to 10			
MeF	Manor soils, 45 to 65 percent slopes.	(3)	6 to 12			
MgA	Melvin silt loam, 0 to 3 percent slopes.	0 to 1	(3)	Poorly drained soils on the flood plains; developed in alluvium derived from limestone. Very wet; standing water; frequently flooded.	0 to 8 8 to 16 16 to 48+	Silt loam Silt loam Silty clay loam
MmB2	Montalto silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	5 to 8	Well-drained, deep upland soils that developed in residuum weathered from basic rocks, strongly oxidized; some stones or boulders below depths of 24 inches. The few severely eroded spots have lost all of the original surface soil. The very stony silt loams have from 30 to 90 percent of surface covered with stones, boulders, and ledges of diabase.	0 to 12 12 to 54 54 to 72+	Silt loam Silty clay loam Silt loam
MmC2	Montalto silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	5 to 8			
MnD2	Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded.	(3)	5 to 8			
MoC2	Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded.	(3)	0 to 6			
MoE2	Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded.	(3)	0 to 6			
NeB2	Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	5 to 8	Well-drained, deep upland soils that developed in residuum weathered from crystalline rocks invaded by diabase or, in places, by serpentine. The severely eroded soils have lost most, and in places all, of the original surface soil through erosion; a few to many gullies, mostly shallow but some extending into the substratum.	0 to 8 8 to 23 23 to 48 48 to 60+	Silt loam Silty clay loam Clay loam Silt loam
NeC2	Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	5 to 8			
NsB3	Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded.	(3)	3 to 6			
NsC3	Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded.	(3)	3 to 6			
NsD3	Neshaminy silty clay loam, 15 25 percent slopes, severely eroded.	(3)	3 to 6			
PeA2	Penn silt loam, 0 to 3 percent slopes, moderately eroded.	(3)	2 to 3	Well-drained to somewhat excessively drained, shallow to moderately deep upland soils that developed in residuum weathered from red shale and sandstone. Fractured shale bedrock is GM or GC. The severely eroded areas have lost most, and in places all, of the original surface soil; a few to many	0 to 5 5 to 16 16 to 28 28+	Silt loam Silt loam Channery silt loam. ----------
PeB2	Penn silt loam, 3 to 8 percent slopes, moderately eroded.	(3)	2 to 3			
PeB3	Penn silt loam, 3 to 8 percent slopes, severely eroded.	(3)	0 to 2			
PeC2	Penn silt loam, 8 to 15 percent slopes, moderately eroded.	(3)	2 to 3			
PeC3	Penn silt loam, 8 to 15 percent slopes, severely eroded.	(3)	0 to 2			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML or CL	A–4 or A–6	80	100	100	0.20 to 0.63	Crumb to subangular blocky.	6.1 to 6.5	High	Low.
ML or CL	A–4 or A–6	85	100	100	.20 to 0.63	Blocky	5.6 to 6.5	Moderate	Moderate.
CL or CH	A–6 or A–7	90	100	100	.06 to 0.20	Blocky	5.6 to 6.0	Moderate	Moderate.
ML	A–4	80	100	100	.63 to 2.0	Crumb to subangular blocky.	6.1 to 7.3	High	Low.
CL or CH	A–6 or A–7	90	100	100	.20 to 0.63	Blocky and subangular blocky.	5.1 to 5.5	Moderate	Moderate.
ML	A–4	70	85	95	.20 to 0.63	Massive	5.6 to 6.5		Low.
ML	A–4	70	90	95	.63 to 2.0	Granular to subangular blocky.	5.1 to 5.5	High	Low.
ML or CL	A–4 or A–6	75	90	95	.20 to 0.63	Blocky and subangular blocky.	5.1 to 5.5	Moderate	Moderate.
CL or CH	A–6 or A–7	75	85	90	.06 to 0.20	Blocky to platy	5.1 to 5.5	Moderate	Moderate.
ML	A–4 or A–5	60	75	85	.20 to 0.63	Massive	5.5 to 6.0		Moderate.
ML	A–4	75	90	95	.63 to 2.0	Crumb to subangular blocky.	4.5 to 6.0	Moderate	Low.
ML or CL	A–4 or A–6	80	90	95	.20 to 2.0	Subangular blocky	4.5 to 5.0	Moderate	Low.
GM	A–4 or A–2	35	50	60	.20 to 2.0	Subangular blocky	4.5 to 5.0	High	Low.
GM or GC	A–2	15	20	30		(Fractured shale)			

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
PeC4	Penn silt loam, 8 to 15 percent slopes, very severely eroded.	(3)	0 to 2	gullies, some to bedrock. The soils on 45 to 65 percent slopes consist of only slightly eroded Penn silt loams and very stony loams. The very severely eroded soil is very shallow; bedrock is exposed in many places.		
PeD2	Penn silt loam, 15 to 25 percent slopes, moderately eroded.	(3)	2 to 3			
PeD3	Penn silt loam, 15 to 25 percent slopes, severely eroded.	(3)	0 to 2			
PeE2	Penn silt loam, 25 to 45 percent slopes, moderately eroded.	(3)	2 to 3			
PsF	Penn soils, 45 to 65 percent slopes.	(3)	0 to 3			
PvC2	Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded.	(3)	0 to 3			
PvE2	Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded.	(3)	0 to 3			
ReA	Readington silt loam, 0 to 3 percent slopes.	1 2	3 to 4	Moderately well drained upland soils that developed in residuum derived from red shale and sandstone. Moderately wet. Dense fragipan in lower part of subsoil.	0 to 6	Silt loam
ReA2	Readington silt loam, 0 to 3 percent slopes, moderately eroded.	1 2	3 to 4		6 to 30	Silty clay loam
ReB2	Readington silt loam, 3 to 8 percent slopes, moderately eroded.	1 2	3 to 4		30 to 36+	Silt loam
RkA	Roanoke silt loam, 0 to 8 percent slopes.	1 to 2	(2)	Poorly drained soils on terraces; developed in old alluvium derived from crystalline rocks. Very wet.	0 to 9	Silt loam
					9 to 28	Silty clay
					28 to 36+	Gravelly sandy clay.
Rn	Rock land	(3)	0 to 1	Barren exposed rock or rock covered by a thin deposit of sandy or silty material.		
RoA	Rowland silt loam, 0 to 8 percent slopes.	1 to 2	(2)	Moderately well drained soils on flood plains; developed in alluvium derived from red shale and sandstone; slightly more clayey at greater depths. Fairly frequently flooded.	0 to 4	Silt loam
					4 to 36+	Silt loam
RsB2	Rumford loamy sand, 3 to 8 percent slopes, moderately eroded.	6+	(2)	Somewhat excessively drained, deep, very sandy soils that developed on coastal-plain sand.	0 to 17	Loamy sand
					17 to 25	Loamy fine sand.
					25 to 34	Fine sandy loam.
					34 to 48+	Fine sand
SaB2	Sassafras loam, 3 to 8 percent slopes, moderately eroded.	6+	(2)	Well-drained, deep upland soils on coastal-plain deposits. Sandy loams generally are SM in A horizon and SC in B horizon. The D horizon of the Sassafras loam, clay substratum, is gravelly sandy clay (GC).	0 to 7	Loam to silt loam.
SaC2	Sassafras loam, 8 to 15 percent slopes, moderately eroded.	6+	(2)		7 to 30	Silty clay loam.
SfB2	Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded.	4+	(2)		30 to 66	Sandy clay loam.
					66 to 72+	Coarse sand
SsB2	Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded.	6+	(2)			
SsC2	Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded.	6+	(2)			
SsE2	Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded.	6+	(2)			

See footnotes at end of table.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A–4	75	100	100	0.20 to 2.0	Weak platy to subangular blocky.	4.5 to 5.5	High	Low.
ML or CL	A–6	85	100	100	.06 to 0.20	Platy and subangular blocky.	4.5 to 5.0	Moderate	Moderate.
ML	A–4	50	60	75	.06 to 0.20	None			Low.
ML	A–4	75	100	100	.20 to 0.63	Granular to platy	4.5 to 5.5	High	Low.
CL or CH	A–6 or A–7	85	90	95	.06 to 0.20	Blocky to platy	4.5 to 5.0	Moderate	Moderate.
GC	A–2	25	35	40	.06 to 0.63	None	4.5 to 5.0		Moderate.
ML	A–4	75	100	100	.63 to 0.63	Subangular blocky	5.1 to 5.5	High	Low.
ML	A–4	85	95	100	.06 to 0.63	Blocky to platy	4.5 to 5.0	Moderate	Low.
SP-SM	A–2 or A–3	10	100	100	>6.3	Crumb to single grain	4.5 to 5.5	High	Very low.
SM	A–2	12	100	100	>6.3	Single grain	4.5 to 5.0	High	Very low.
SM	A–2	20	95	100	2.0 to 6.3	Subangular blocky	4.5 to 5.0	High	Very low.
SP-SM	A–2 or A–3	5	95	100	>6.3	None	4.5 to 5.0	High	Very low.
ML	A–4	55	95	100	.63 to 2.0	Crumb, granular, or blocky.	5.1 to 5.5	Moderate	Low.
CL	A–6	75	90	95	.20 to 2.0	Blocky to subangular blocky.	4.5 to 5.5	Moderate	Moderate.
SC	A–2	30	80	90	.20 to 2.0	Blocky	4.5 to 5.0	High	Low.
SW or GW	A–1	5	30	50	2.0 to 6.3	None			Very low.

TABLE 5.—*Brief description of soils and their*

Map symbol	Soil	Depth to seasonally high water table	Depth to bedrock	Brief description of site and soil	Depth from surface (typical profile)	USDA (textural class)
		Feet	*Feet*		*Inches*	
StC	Stony land, Manor materials, 3 to 15 percent slopes.	(3)	0 to 4	Similar to Manor channery silt loam but from 30 to 90 percent is stones, boulders, and ledges of hard mica schist.	0 to 4	Channery stony silt loam.
StE	Stony land, Manor materials, 15 to 45 percent slopes.	(3)	0 to 4		4 to 20	Channery stony silty clay loam.
					20+	
UbA	Urbana silt loam, 0 to 3 percent slopes.	(1 3)	3 to 5	Moderately well drained upland soils that developed in residuum derived from actinolite schist. Moderately wet. Fragipan in lower part of subsoil. The severely eroded soil has lost most, and in places all, of the original surface soil; the subsoil is very near surface or exposed.	0 to 8	Silt loam
UbB2	Urbana silt loam, 3 to 8 percent slopes, moderately eroded.	(1 3)	3 to 5		8 to 20	Silty clay loam.
UbC2	Urbana silt loam, 8 to 15 percent slopes, moderately eroded.	(1 3)	3 to 5		20 to 36+	Silt loam
UbC3	Urbana silt loam, 8 to 15 percent slopes, severely eroded.	(1 3)	2 to 4			
WcB	Watchung silt loam, 0 to 8 percent slopes.	0 to 1	3 to 6	Poorly drained soils in draws and depressions; developed in residuum derived from basic rocks; some colluvial surface material. Very wet; water occasionally stands on this soil.	0 to 6	Silt loam
					6 to 28	Clay loam to clay.
					28 to 36+	Clay loam
WhA	Wehadkee silt loam, 0 to 3 percent slopes.	0 to 1	(2)	Poorly drained soil on flood plains; developed in alluvium derived from crystalline rocks. Very wet; fairly frequently flooded.	0 to 6	Silt loam
					6 to 24	Silty clay loam.
					24 to 48+	Silty clay loam.
WkA	Wickham silt loam, 0 to 3 percent slopes.	5+	(2)	Well-drained, deep soils on high terraces; developed in very old alluvium derived from crystalline rocks; amount of gravel increases with depth.	0 to 8	Silt loam
WkB2	Wickham silt loam, 3 to 8 percent slopes, moderately eroded.	5+	(2)		8 to 24	Silty clay loam.
					24 to 36+	Gravelly silty clay loam.
WkC2	Wickham silt loam, 8 to 15 percent slopes, moderately eroded.	5+	(2)			
WoA	Worsham silt loam, 0 to 8 percent slopes.	0 to 1	5 to 8	Poorly drained soils in draws and depressions; developed in residuum derived from crystalline rocks; some colluvial surface material. Very wet; water occasionally stands on this soil.	0 to 11	Silt loam
					11 to 50	Silty clay loam.
					50 to 60+	Silt loam

[1] These soils have a slowly permeable fragipan in the subsoil. At times a perched water table is directly above the fragipan and is separated from a lower, more permanent water table by a layer of dry soil.

[2] These soils developed in unconsolidated, stratified material that consists of old or new alluvium or of coastal-plain deposits of gravel, sand, silt, or other material. In the coastal-plain areas, depth to bedrock cannot be determined; in most other areas, it is undetermined but usually great; on some old terraces, particularly in areas of Captina and Elk soils near Great Falls where alluvium has been deposited over rock, unconforming bedrock is within a few feet of the surface.

estimated physical properties—Continued

Engineering classification		Percentage passing—			Selected characteristics significant in engineering				
Unified	AASHO	No. 200 sieve	No. 10 sieve	No. 4 sieve	Range in permeability	Structure	Reaction	Dispersion	Shrink-swell potential
					Inches per hour		*pH*		
ML	A-4	40	60	70	0.63 to 2.0	Granular	5.1 to 5.5	High	Low.
GM or ML	A-2 or A-4	25	35	45	.20 to 2.0	Blocky to subangular blocky.	4.5 to 5.0	Moderate	Low.
						(Hard mica schist)			
ML	A-4	75	95	100	.63 to 2.0	Crumb	5.1 to 5.5	Moderate	Low.
ML or CL	A-4 or A-6	70	85	90	.06 to 0.63	Platy and blocky	4.5 to 5.5	Moderate	Moderate.
ML or MH	A-4 or A-5	55	60	65	.20 to 0.63	None			Moderate.
ML	A-4	80	100	100	.20 to 0.63	Crumb	4.5 to 5.0	High	Low.
CL or CH	A-7 or A-6	90	100	100	.02 to 0.06	Blocky	5.1 to 6.0	Low	High.
CL	A-6	60	75	80	.06 to 0.20	None	6.1 to 7.3		Moderate.
ML	A-4	75	100	100	.63 to 2.0	Granular to platy	5.1 to 5.5	High	Low.
ML or CL	A-6 or A-4	80	100	100	.20 to 0.63	Platy	4.5 to 5.0	High	Moderate.
CL	A-6	80	100	100	.20 to 0.63	Blocky and platy	4.5 to 5.0	Moderate	Moderate.
ML	A-4	70	90	95	.63 to 2.0	Crumb	5.1 to 5.5	High	Low.
CL	A-6	80	90	95	.20 to 0.63	Blocky and subangular blocky.	4.5 to 5.0	Moderate	Moderate.
SC or GC	A-2	30	45	55	.63 to 2.0	Blocky	4.5 to 5.0	Moderate	Low.
ML	A-4	80	100	100	.20 to 0.63	Crumb	5.1 to 5.5	High	Low.
ML or CL	A-6 or A-4	85	100	100	.06 to 0.20	Platy and blocky	4.5 to 5.5	Moderate	Moderate.
ML	A-4 or A-5	60	80	85	.20 to 0.63	None	4.5 to 5.0		Low.

[3] In most residual soils, depth to the water table cannot be estimated but normally the water table is within the bedrock.

[4] In the Chillum and Penn gravelly silt loams, bedrock is commonly 10 feet or more below the surface, but where the Penn soils are at or near the surface, generally at the fringes of delineations, bedrock is within 2 or 3 feet of the surface, as it is in the Penn soils.

Soil interpretations for engineering purposes

Table 6 lists, for each soil in Montgomery County, specific characteristics that might affect the suitability of the soil for various engineering purposes. These interpretations are based on the information in table 5, on various test data, and on field performance.

The interpretations in table 6 are general and will not take the place of examination and evaluation of the soil at the exact site of a planned engineering project.

Irrigation soil groups

Rainfall in Montgomery County normally is adequate for agricultural purposes but is not always well distrib-

TABLE 6.—*Soil characteristics*

Soil type and map symbols	Suitability for winter grading	Susceptibility to frost action	Suitability as material for—		Suitability as a source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Aldino silt loam (AdA, AdB2, AdC2, AdC3).	Not suitable	Strong	Poor	Poor	Fair	Not suitable
Ashton silt loam (AsA, AsB2).	Not suitable	Moderate	Fair	Fair	Very good	Not suitable
Beltsville silt loam (BaA2, BaB2, BaC2).	Not suitable	Strong	Poor	Poor	Fair	Gravelly substratum locally.
Bermudian silt loam (BeA, BeB).	Not suitable	Moderate to strong.	Fair	Fair	Good	Not suitable
Bowmansville silt loam (BoA).	Not suitable	Very strong	Poor	Poor	Poor to fair	Gravelly substratum locally.
Brandywine loam (BrC2, BrC3, BrD2, BrD3).	Poor to fair	Slight	Good	Good	Poor to fair	Gravel locally
Bucks silt loam (BuA, BuA2, BuB2, BuB3, BuC3).	Not suitable	Slight to moderate.	Poor to fair	Poor to fair	Good	Not suitable
Calvert silt loam (CaB).	Not suitable	Very strong	Very poor	Very poor	Poor	Not suitable
Captina silt loam (CbA, CbB2).	Not suitable	Strong	Poor	Poor	Fair to good	Not suitable
Chester silt loam (ChA, ChA2, ChB2, ChB3, ChC2, ChC3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Good	Not suitable
Chewacla silt loam (CkA).	Not suitable	Strong	Poor	Poor	Fair	Gravelly substratum locally.
Chillum gravelly silt loam (ClB2, ClB3, ClC2, ClC3, ClD2, ClE2).	Not suitable	Slight	Very good	Very good	Poor to fair	Substratum excellent for gravel; some local sand deposits.
Chillum silt loam (CmB2, CmC2, CmD2).	Not suitable	Slight	Very good	Very good	Poor to fair	Substratum excellent for gravel; some local sand deposits.
Chillum and Penn gravelly silt loams. (CnB2, CnB3, CnC2, CnD3).	Not suitable	Slight	Very good	Very good	Poor to fair	Substratum excellent for gravel; some local sand deposits; but less extensive than in Chillum soils.
Chrome silt loam (CoC2).	Not suitable	Strong	Poor	Poor	Poor	Not suitable
Chrome very stony silt loam (CpD2).	Not suitable	Strong	Poor	Poor	Poor	Not suitable
Chrome and Conowingo silt loams. (CrB2, CrB3).	See Chrome silt loam and Conowingo silt loam.					
Colluvial land (Cs).	Not suitable	Very strong	Poor	Poor	Fair	Not suitable
Congaree silt loam (CtA).	Not suitable	Moderate to strong.	Fair	Fair	Good	Sandy, gravelly substratum locally.
Conowingo silt loam (CvA2, CvA3).	Not suitable	Strong	Poor	Poor	Poor	Not suitable
Croom gravelly loam (CwB2, CwC2, CwC3, CwD2, CwD3, CwE2, CwE3).	Poor to fair	Slight	Very good	Very good	Poor	Good gravel, some sand.
Croton silt loam (CxA).	Not suitable	Very strong	Poor	Poor	Fair	Not suitable

uted. Frequently, extended dry periods occur between June and September. If an irrigation system and an adequate supply of water were readily available, yields would not be drastically reduced in periods of drought.

In this section, the better agricultural soils are grouped according to characteristics that significantly affect their suitability for conservation irrigation. Conservation irrigation is the application of irrigation water in amounts needed to maintain the production of crops at a high level without waste of water and without damage to the soil. All irrigation referred to in this section is by sprinkler system.

that affect engineering

Factors that may affect engineering practices for—							
Vertical alinement of highways		Impoundments		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Material	Drainage	Reservoir areas	Embankments				
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
	Infrequent flooding.	Low terraces	Very high in silt.	Not needed	No limtations	Erodible	Erodible.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
	Occasional flooding.	Flood plain	Very high in silt.	Not needed	No limitations.	Erodible	Erodible.
	Poor; frequent floods.	Flood plain	Very high in silt.	Wet flood plain.	Poor drainage	Erodible	Erodible.
Shallow to bedrock.	None	Permeable substratum.	Thin solum	Not needed	Very shallow	Thin solum	Highly erodible.
	None	Suitable	Very high in silt.	Not needed	No limitations.	Highly erodible.	Highly erodible.
Heavy clay	Poor	Suitable	Heavy clay	Slow permeability.	Poor drainage	Highly erodible.	Highly erodible.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
	Impeded; flooding.	Flood plain	Very high in silt.	High water table.	Impeded drainage.	Highly erodible.	Highly erodible.
	None	Gravelly, cemented substratum of variable permeability.	Generally very suitable.	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Gravelly, cemented substratum of variable permeability.	Generally very suitable.	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Gravelly, cemented substratum of variable permeability.	Generally very suitable.	Not needed	No limitations.	Highly erodible.	Highly erodible.
Silty clay	None	Suitable	Silty clay	Not needed	Shallow	Highly erodible.	Highly erodible.
Silty clay, stones.	None	Stones	Stones, clay	Not needed	Shallow, stony.	Stones, highly erodible.	Stones, highly erodible.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
	Occasional flooding.	Flood plain	Suitable	Not needed	No limitations.	Erodible	Erodible.
Silty clay	Impeded	Suitable	Silty clay	Slow permeability.	Impeded drainage.	Highly erodible.	Highly erodible.
	None	Permeable cemented gravel substratum.	Generally very suitable.	Not needed	No limitations.	Highly erodible.	Highly erodible.
Fragipan	Poor	Fragipan	Fragipan	Fragipan	Poor drainage.	Erodible	Erodible.

TABLE 6.—*Soil characteristics*

Soil type and map symbols	Suitability for winter grading	Susceptibility to frost action	Suitability as material for—		Suitability as a source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Edgemont gravelly sandy loam (EdB2, EdC3).	Fair	None to slight.	Good	Good	Poor to fair	Not suitable
Elioak silt loam (EeA, EeB2, EeC2).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Elioak silty clay loam (EkB3, EkC3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Elk silt loam (ElA2, ElB2).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Good to very good.	Gravelly substratum locally.
Elk silty clay loam (EmC3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Good to very good.	Gravelly substratum locally.
Eroded land, Penn materials (Ep).	Not suitable	Moderate	Good	Good	Poor	Not suitable.
Glenelg channery silt loam (GcB2, GcB3, GcC2, GcC3, GcD2, GcD3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Glenelg gravelly loam (GgB2, GgB3, GgC2, GgC3, GgD2).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Glenelg silt loam (GhA, GhB2, GhB3, GhC2, GhC3, GhD2, GhD3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Glenelg soils (GlE2, GlE3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Glenville silt loam (GmA, GmB, GmB2).	Not suitable	Strong	Poor	Poor	Fair	Not suitable
Gullied land, Penn materials (Gr).	Not suitable	Moderate	Good	Good	Poor	Not suitable
Huntington silt loam (HaA, HaB2).	Not suitable	Moderate to strong.	Fair	Fair	Very good	Not suitable
Iredell silt loam (IdA, IdB2).	Not suitable	Strong	Very poor	Very poor	Poor	Not suitable
Iredell silty clay loam (IeC3).	Not suitable	Strong	Very poor	Very poor	Poor	Not suitable
Lakeland loamy sand (LaC2, LaD3).	Good	None to slight.	Good	Good	Poor	Sand subsoil
Legore silt loam (LeB2, LeB3, LeC2, LeC3, LeD3).	Not suitable	Moderate	Poor	Poor	Good	Not suitable
Leonardtown silt loam (LgA2, LgB2).	Not suitable	Strong to very strong.	Poor	Poor	Poor	Gravelly substratum locally.
Lewisberry sandy loam, shallow (LhA2, LhB2, LhB3, LhC2, LhC3, LhD2, LhD3, LhE3).	Poor to fair	Slight	Good	Good	Fair	Not suitable
Lindside silt loam (LnA).	Not suitable	Strong	Poor	Poor	Fair to good	Not suitable
Linganore channery silt loam (LoB2, LoC2, LoD2).	Poor to fair	None to slight.	Good	Fair to good	Poor to fair	Not suitable
Linganore channery silty clay loam. (LrB3, LrC3, LrD3, LrE3).	Poor to fair	None to slight.	Good	Fair to good	Poor to fair	Not suitable
Manor channery silt loam (McB2, McB3, McC2, McC3, McD2, McD3, McE2, McE3).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Manor silt loam (MdB2, MdB3, MdC2, MdC3, MdD2, MdD3, MdE2).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Manor soils (MeC4, MeD4, MeE3, MeF).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Fair to good	Not suitable
Melvin silt loam (MgA).	Not suitable	Very strong	Poor	Poor	Fair to good	Not suitable
Mixed alluvial land (Mh).	Not suitable	Moderate to very strong.	Variable	Variable	Poor to fair	Gravelly substratum locally.
Montalto silt loam (MmB2, MmC2).	Not suitable	Moderate	Poor to fair	Poor to fair	Fair to good	Not suitable
Montalto silty clay loam (MnD2).	Not suitable	Moderate	Poor to fair	Poor to fair	Fair to good	Not suitable
Montalto very stony silt loam (MoC2, MoE2).	Not suitable	Moderate	Poor to fair	Poor to fair	Fair	Not suitable

that affect engineering—Continued

Factors that may affect engineering practices for—							
Vertical alinement of highways		Impoundments		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Material	Drainage	Reservoir areas	Embankments				
	None	Permeable substratum.	Suitable	Not needed	Low capacity.	Erodible	Erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
	None	Shaly substratum	Too shaly	Not needed	Shallow, shaly.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
	None	Shaly substratum	Too shaly	Not needed	Unsuitable	Highly erodible.	Highly erodible.
	Occasional flooding.	Flood plain	Very high in silt.	Not needed	No limitations.	Erodible	Erodible.
Heavy clay	Impeded	Suitable	Heavy clay	Slow permeability.	Impeded drainage.	Highly erodible.	Highly erodible.
Heavy clay	Impeded	Suitable	Heavy clay	Slow permeability.	Impeded drainage.	Highly erodible.	Highly erodible.
	None	Very sandy	Very sandy	Not needed	Very sandy	Very sandy	Very sandy.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Erodible	Erodible.
	None	Shallow, very permeable.	Thin solum	Not needed	Shallow	Erodible	Erodible.
	Impeded; flooding.	Flood plain	Very high in silt.	High water table.	Impeded drainage.	Highly erodible	Highly erodible.
Shallow to bedrock.	None	Shallow	Very channery.	Not needed	Very shallow	Thin solum	Highly erodible.
Shallow to bedrock.	None	Shallow	Very channery.	Not needed	Very shallow	Thin solum	Highly erodible.
	None	Channery substratum.	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Channery substratum.	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible
	None	Channery substratum.	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	Poor; frequent floods.	Flood plain	Very high in silt.	Wet flood plain.	Poor drainage.	Erodible	Erodible.
	Variable	Flood plain	Variable	Variations	Variable	Variable	Variable.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
Very stony	None	Very stony	Very stony	Not needed	Very stony	Very stony	Very stony.

TABLE 6.—*Soil characteristics*

Soil type and map symbols	Suitability for winter grading	Susceptibility to frost action	Suitability as material for—		Suitability as a source of—	
			Road subgrade	Road fill	Topsoil	Sand and gravel
Neshaminy silt loam (NeB2, NeC2).	Not suitable	Moderate	Fair to good	Fair to good	Good	Not suitable
Neshaminy silty clay loam (NsB3, NsC3, NsD3).	Not suitable	Moderate	Fair to good	Fair to good	Good	Not suitable
Penn silt loam (PeA2, PeB2, PeB3, PeC2, PeC3, PeC4, PeD2, PeD3, PeE2).	Not suitable	Slight to moderate.	Good	Good	Fair to good	Not suitable
Penn soils (PsF).	Not suitable	Slight to moderate.	Good	Good	Fair to good	Not suitable
Penn very stony silt loam (PvC2, PvE2).	Not suitable	Slight to moderate.	Good	Good	Fair to good	Not suitable
Readington silt loam (ReA, ReA2, ReB2).	Not suitable	Strong	Poor	Poor	Fair to good	Not suitable
Roanoke silt loam (RkA).	Not suitable	Very strong	Poor	Poor	Poor	Not suitable
Rock land (Rn).	Not suitable	Slight to moderate.	Good; rocky	Good; rocky	Fair; rocky	Not suitable
Rowland silt loam (RoA).	Not suitable	Strong	Poor	Poor	Fair	Gravelly substratum locally.
Rumford loamy sand (RsB2).	Good	None to slight	Good	Good	Poor	Sandy substratum
Sassafras loam (SaB2, SaC2).	Poor	Slight to moderate.	Good	Fair to good	Fair to good	Gravelly substratum locally.
Sassafras loam, clayey substratum phase. (SfB2).	Poor	Moderate	Good	Fair to good	Fair to good	Clayey, gravelly substratum.
Sassafras sandy loam (SsB2, SsC2, SsE2).	Fair	Slight	Good	Good	Fair to good	Gravelly substratum locally.
Stony land, Manor materials (StC, StE).	Not suitable	Slight to moderate.	Good; stony	Good; stony	Fair; stony	Not suitable
Urbana silt loam (UbA, UbB2, UbC2, UbC3).	Not suitable	Strong	Poor	Poor	Fair	Not suitable
Watchung silt loam (WcB).	Not suitable	Very strong	Poor	Poor	Poor to fair	Not suitable
Wehadkee silt loam (WhA).	Not suitable	Very strong	Poor	Poor	Poor to fair	Gravelly substratum locally.
Wickham silt loam (WkA, WkB2, WkC2).	Not suitable	Slight to moderate.	Fair to good	Fair to good	Good	Gravelly substratum locally.
Worsham silt loam (WoA).	Not suitable	Very strong	Poor	Poor	Poor	Not suitable

This section is not intended to be a guide for the design of sprinkler irrigation systems. Such a guide has been compiled for the State of Maryland (*12*) and has been used as a reference. This section is based on the best information available concerning the soils, water supplies, climate, crops, cultural practices, and farm conditions in the county. It can be used as a general reference but will not substitute for an on-site investigation.

If irrigation is practiced, it should be part of a complete farm program of soil and water conservation. Irrigation is expensive and should be used only on soils that are highly productive and that can be made more productive by irrigation. These soils should be liberally fertilized and adequately limed. Crop rotations or other cropping systems should include crops that will help control erosion, minimize leaching, maintain good tilth, and furnish organic matter. For these reasons, only the soils in capability classes I, II, and III are included in the irrigation groups.

To be suitable for irrigation, soils must have good drainage. Some moderately well drained soils are included in the irrigation groups, but they should be artificially drained if they are irrigated. Soils that are poorly drained or somewhat poorly drained are not included.

Irrigating an extensive area requires large amounts of water. The water supply should be adequate to maintain optimum moisture in the soil during a prolonged dry period. A common mistake is to attempt irrigation with too little water. An ordinary farm pond will not supply enough water to irrigate anything except very small home gardens.

Water may be obtained from wells, streams, or reservoirs. Only streams that have a constant flow during extended droughts are suitable sources of water for irrigation. The streamflow should be measured in a period of drought to determine if sufficient water would be available for irrigation. The storage capacity of a surface

that affect engineering—Continued

Factors that may affect engineering practices for—							
Vertical alinement of highways		Impoundments		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Material	Drainage	Reservoir areas	Embankments				
----------	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
----------	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
----------	None	Shaly substratum	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
----------	None	Shaly substratum	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
Very stony	None	Very stony	Very stony	Not needed	Very stony	Very stony	Very stony.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Erodible	Erodible.
----------	Poor	Suitable	Very high in silt.	High water table.	Poor drainage	Erodible	Erodible.
Very rocky	None	Very rocky	Very rocky	Not needed	Very rocky	Very rocky	Very rocky.
----------	Impeded; flooding.	Flood plain	Very high in silt.	High water table.	Impeded drainage.	Highly erodible.	Highly erodible.
----------	None	Very sandy	Very sandy	Not needed	Very sandy	Very sandy	Very sandy.
----------	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
----------	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
----------	None	Suitable	Suitable	Not needed	No limitations.	Erodible	Erodible.
Very stony	None	Very stony	Very stony	Not needed	Very stony	Very stony	Very stony.
Fragipan	Impeded	Fragipan	Fragipan	Fragipan	Impeded drainage.	Highly erodible.	Highly erodible.
Heavy clay	Poor	Suitable	Heavy clay	Slow permeability.	Poor drainage	Highly erodible.	Highly erodible.
----------	Poor; frequent floods.	Flood plain	Very high in silt.	Wet flood plain.	Poor drainage	Erodible	Erodible.
----------	None	Suitable	Suitable	Not needed	No limitations.	Highly erodible.	Highly erodible.
----------	Poor	Suitable	Very high in silt.	Slow permeability.	Poor drainage	Highly erodible.	Highly erodible.

reservoir must be large enough to meet crop needs in the irrigation season and to make up for losses caused by evaporation and seepage. Generally, 1 acre-foot of stored water is needed for each acre to be irrigated during the irrigation season. A reservoir of smaller capacity can be used if it can be refilled between irrigations.

The quality of the water also must be determined. If the suitability of the water is questioned, samples can be sent to the State Soil Testing Laboratory, Agronomy Department, University of Maryland, College Park. This laboratory can analyze for acidity, salt content, or other characteristics that might be harmful to crops.

To be successful, irrigation must meet the needs of both crops and soils. Different crops need different amounts of water applied at different intervals. Some soils hold much water and others hold little; some soils absorb water readily and others absorb it slowly.

Each group shown in table 7 consists of soils that are similar in the characteristics that affect their suitability for irrigation. The table shows, for different crops, the rates at which water can be applied without waste and without damage to the soil, the depths to which the soils should be irrigated, and the amounts of water the soils can supply to crops.

Truck groups 1, 2, and 3, referred to in table 7, consist of the following:

Truck group 1	Truck group 2	Truck group 3
Very shallow rooted crops	*Shallow rooted crops*	*Moderately deep rooted crops*
Lettuce.	Beets	Asparagus.
Onions.	Broccoli.	Eggplant.
Spinach.	Cabbage.	Lima beans.
Strawberries.	Cauliflower.	Melons.
	Celery.	Peppers.
	Cucumbers.	Pumpkins.
	Peas.	Squash.
	Snap beans.	

Tomatoes are deeper rooted than the crops in the truck groups; they are listed separately in table 7. Grass mix-

tures may include any of several grasses commonly used for pasture or hay and may include clover or alfalfa. Soybeans and sorghum are commonly planted as a combination for silage. Orchards include both peach and apple orchards, but few apples are grown. "Orchard with cover" indicates that a close-growing crop covers the soil between the fruit trees. "Orchard without cover" indicates that the soil between fruit trees is bare or nearly so.

TABLE 7.—*Irrigation soil groups, suitable crops, and certain water relationships*

[Generally, only moderately well drained to somewhat excessively drained soils that are in capability classes I, II, and III are suitable for irrigation, but there are some exceptions]

Irrigation groups and soils	Estimated maximum rate of application on level and nearly level soils [1]	Suitable crops	Estimated average depth to be irrigated	Estimated average available moisture capacity [2]
	In./hr.		*In.*	*In.*
Group 1: Somewhat excessively drained, very sandy soil that has a deep, very sandy subsoil.	1.0	Truck group 1	18	1.5
Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded.	1.0	Truck group 2	24	2.0
	1.0	Truck group 3	30	2.5
	1.0	Corn	27	2.3
	1.0	Sweet corn	24	2.0
	1.0	Alfalfa	36	3.0
	1.0	Grass mixture	21	1.8
	1.0	Tomatoes	27	2.3
	1.0	Orchards	36	3.0
Group 2: Somewhat excessively drained, very sandy soil that has a moderately coarse textured subsoil underlain by sand.	.9	Truck group 1	18	1.5
Rumford loamy sand, 3 to 8 percent slopes, moderately eroded.	.9	Truck group 3	18	1.5
	.9	Truck group 3	18	1.5
	.9	Corn	26	2.8
	.9	Sweet corn	24	2.5
	1.0	Alfalfa	26	2.8
	1.0	Grass mixture	18	1.5
	.9	Soybeans and sorghum	21	2.0
	.9	Tomatoes	26	2.8
	1.0	Orchards with cover	26	2.8
	.9	Orchards without cover	26	2.8
Group 3: Well drained to excessively drained sandy loams that have a medium-textured to fine-textured subsoil underlain by rock.	.5	Truck group 1	12	1.7
Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.	.5	Truck group 2	15	2.2
Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded.	.5	Truck group 3	18	2.7
	.5	Corn	24	3.7
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded.	.5	Sweet corn	18	2.7
	1.0	Alfalfa	27	4.2
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded.	1.0	Ladino clover	18	2.7
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded.	1.0	Grass mixture	18	2.7
	.5	Soybeans and sorghum	21	3.2
	.5	Tomatoes	24	3.7
	1.0	Orchards with cover	27	4.2
	.5	Orchards without cover	27	4.2
Group 4: Well-drained sandy loams that have a medium-textured subsoil underlain by sand and gravel.	.6	Truck group 1	12	1.7
Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded.	.6	Truck group 2	15	2.2
Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded.	.6	Truck group 3	18	2.7
	.6	Corn	24	3.7
	.6	Sweet corn	18	2.7
	1.0	Alfalfa	27	4.2
	1.0	Ladino clover	18	2.7
	1.0	Grass mixture	18	2.7
	.6	Soybeans and sorghum	21	3.2
	.6	Tomatoes	24	3.7
	1.0	Orchards with cover	27	4.2
	.6	Orchards without cover	27	4.2
Group 5: Well drained and moderately well drained, very deep silty loams that are underlain by unconsolidated sand, silt, and gravel.	.5	Truck group 1	12	2.0
Ashton silt loam, 0 to 3 percent slopes.	.5	Truck group 2	15	2.5
Ashton silt loams, 3 to 8 percent slopes, moderately eroded.	.5	Truck group 3	18	3.0
Bermudian silt loam, 0 to 3 percent slopes.	.5	Corn	24	4.0
Bermudian silt loam, 3 to 8 percent slopes.	.5	Sweet corn	18	3.0
Chewacla silt loam, 0 to 3 percent slopes.[3]	.8	Alfalfa	27	4.5
Congaree silt loam, 0 to 3 percent slopes.	.8	Ladino clover	18	3.0
Huntington silt loam, 0 to 3 percent slopes.	.8	Grass mixture	18	3.0
Huntington silt loam, 3 to 8 percent slopes, moderately eroded.	.5	Soybeans and sorghum	21	3.5
Lindside silt loam, 0 to 3 percent slopes.[3]	.5	Tomatoes	24	4.0
Rowland silt loam, 0 to 8 percent slopes.[3]	.8	Orchards with cover	27	4.5
	.5	Orchards without cover	27	4.5

See footnotes at end of table.

TABLE 7.—*Irrigation soil groups, suitable crops, and certain water relationships*—Continued

[Generally, only moderately well drained to somewhat excessively drained soils that are in capability classes I, II, and III are suitable for irrigation, but there are some exceptions]

Irrigation groups and soils	Estimated maximum rate of application on level and nearly level soils [1]	Suitable crops	Estimated average depth to be irrigated	Estimated average available moisture capacity [2]
	In./hr.		*In.*	*In.*
Group 6: Well drained to somewhat excessively drained loams, silt loams, and silty clay loams that have a moderately fine textured subsoil underlain by bedrock or unconsolidated parent material.	0. 4	Truck group 1	12	2. 0
Bucks silt loam, 0 to 3 percent slopes.	. 4	Truck group 2	15	2. 5
Bucks silt loam, 0 to 3 percent slopes, moderately eroded.	. 4	Truck group 3	18	3. 0
Bucks silt loam, 3 to 8 percent slopes, moderately eroded.	. 4	Corn	24	4. 0
Bucks silt loam, 3 to 8 percent slopes, severely eroded.	. 7	Sweet corn	18	3. 0
Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded.	. 7	Alfalfa	27	4. 5
Chester silt loam, 0 to 3 percent slopes.	. 7	Ladino clover	18	3. 0
Chester silt loam, 0 to 3 percent slopes, moderately eroded.	. 4	Grass mixture	18	3. 0
Chester silt loam, 3 to 8 percent slopes, moderately eroded.	. 4	Soybeans and sorghum	21	3. 5
Chester silt loam, 3 to 8 percent slopes, severely eroded.	. 7	Tomatoes	24	4. 0
Chester silt loam, 8 to 15 percent slopes, moderately eroded.	. 4	Orchards with cover	27	4. 5
Elioak silt loam, 0 to 3 percent slopes.		Orchards without cover	27	4. 5
Elioak silt loam, 3 to 8 percent slopes, moderately eroded.				
Elioak silt loam, 8 to 15 percent slopes, moderately eroded.				
Elioak silty clay loam, 3 to 8 percent slopes, severely eroded.				
Elk silt loam, 0 to 3 percent slopes, moderately eroded.				
Elk silt loam, 3 to 8 percent slopes, moderately eroded.				
Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded.				
Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded.				
Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded.				
Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded.				
Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded.				
Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded.				
Glenelg silt loam, 0 to 3 percent slopes.				
Glenelg silt loam, 3 to 8 percent slopes, moderately eroded.				
Glenelg silt loam, 3 to 8 percent slopes, severely eroded.				
Glenelg silt loam, 8 to 15 percent slopes, moderately eroded.				
Legore silt loam, 3 to 8 percent slopes, moderately eroded.				
Legore silt loam, 3 to 8 percent slopes, severely eroded.				
Legore silt loam, 8 to 15 percent slopes, moderately eroded.				
Manor silt loam, 3 to 8 percent slopes, moderately eroded.				
Manor silt loam, 3 to 8 percent slopes, severely eroded.				
Manor silt loam, 8 to 15 percent slopes, moderately eroded.				
Montalto silt loam, 3 to 8 percent slopes, moderately eroded.				
Montalto silt loam, 8 to 15 percent slopes, moderately eroded.				
Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded.				
Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded.				
Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded.				
Sassafras loam, 3 to 8 percent slopes, moderately eroded.				
Sassafras loam, 8 to 15 percent slopes, moderately eroded.				
Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded.				
Wickham silt loam, 0 to 3 percent slopes.				
Wickham silt loam, 3 to 8 percent slopes, moderately eroded.				
Wickham silt loam, 8 to 15 percent slopes, moderately eroded.				
Group 7: Moderately well drained silt loams that have a tough, dense or compact subsoil, or hardpan, within a depth of 20 inches. [4]	. 3	Truck group 1	12	2. 0
Beltsville silt loam, 0 to 3 percent slopes, moderately eroded.	. 3	Truck group 2	15	2. 5
Beltsville silt loam, 3 to 8 percent slopes, moderately eroded.	. 3	Truck group 3	18	3. 0
Beltsville silt loam, 8 to 15 percent slopes, moderately eroded.	. 3	Corn	20	3. 4
Captina silt loam, 0 to 3 percent slopes.	. 5	Sweet corn	20	3. 4
Captina silt loam, 3 to 8 percent slopes, moderately eroded.	. 5	Ladino clover	18	3. 0
Glenville silt loam, 0 to 3 percent slopes.	. 3	Grass mixture	18	3. 0
Glenville silt loam, 3 to 8 percent slopes.	. 3	Soybeans and sorghum	20	3. 4
Glenville silt loam, 3 to 8 percent slopes, moderately eroded.		Tomatoes	20	3. 4
Readington silt loam, 0 to 3 percent slopes.				
Readington silt loam, 0 to 3 percent slopes, moderately eroded.				
Readington silt loam, 3 to 8 percent slopes, moderately eroded.				
Urbana silt loam, 0 to 3 percent slopes.				
Urbana silt loam, 3 to 8 percent slopes, moderately eroded.				
Urbana silt loam, 8 to 15 percent slopes, moderately eroded.				

See footnotes at end of table.

TABLE 7.—*Irrigation soil groups, suitable crops, and certain water relationships*—Continued

[Generally, only moderately well drained to somewhat excessively drained soils that are in capability classes I, II, and III are suitable for irrigation, but there are some exceptions]

Irrigation groups and soils	Estimated maximum rate of application on level and nearly level soils [1]	Suitable crops	Estimated average depth to be irrigated	Estimated average available moisture capacity [2]
	In./hr.		*In.*	*In.*
Group 8: Predominantly moderately well drained silt loams that have a fine-textured, almost impermeable clay subsoil that is within depths of 6 to 12 inches.[4]	0.2	Truck group 1	8	1.3
Aldino silt loam, 0 to 3 percent slopes.	.2	Truck group 2	8	1.3
Aldino silt loam, 3 to 8 percent slopes, moderately eroded.	.2	Truck group 3	8	1.3
Aldino silt loam, 8 to 15 percent slopes, moderately eroded.	.2	Corn	8	1.3
Chrome silt loam, 8 to 15 percent slopes, moderately eroded.[5]	.4	Sweet corn	8	1.3
Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded.[5]	.4	Ladino clover	8	1.3
Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded.[5]	.2	Grass mixture	8	1.3
Conowingo silt loam, 0 to 3 percent slopes, moderately eroded.		Tomatoes	8	1.3
Conowingo silt loam, 0 to 3 percent slopes, severely eroded.				
Group 9: Well drained to somewhat excessively drained loams and silt loams that have a strongly cemented subsoil or substratum.	.4	Truck group 1	12	1.7
Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded.	.4	Truck group 2	15	2.2
Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded.	.4	Truck group 3	18	2.7
Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded.	.4	Corn	24	3.7
Chillum silt loam, 3 to 8 percent slopes, moderately eroded.	.4	Sweet corn	21	3.2
Chillum silt loam, 8 to 15 percent slopes, moderately eroded.	.7	Ladino clover	18	2.7
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded.	.7	Grass mixture	18	2.7
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded.	.4	Soybeans and sorghum	21	3.2
Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded.	.4	Tomatoes	24	3.7
Croom gravelly loam, 3 to 8 percent slopes, moderately eroded.	.7	Orchards with cover	24	3.7
Croom gravelly loam, 8 to 15 percent slopes, moderately eroded.	.4	Orchards without cover	24	3.7
Group 10: Well drained to somewhat excessively drained silt loams that are underlain by bedrock at a depth of about 24 inches.	.3	Truck group 1	12	2.0
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.	.3	Truck group 2	15	2.5
Manor channery silt loam, 3 to 8 percent slopes, severely eroded.	.3	Truck group 3	18	3.0
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.	.3	Corn	24	4.0
Penn silt loam, 0 to 3 percent slopes, moderately eroded.	.3	Sweet corn	18	3.0
Penn silt loam, 3 to 8 percent slopes, moderately eroded.	.6	Alfalfa	24	4.0
Penn silt loam, 3 to 8 percent slopes, severely eroded.	.6	Ladino clover	18	3.0
Penn silt loam, 8 to 15 percent slopes, moderately eroded.	.6	Grass mixture	18	3.0
	.3	Soybeans and sorghum	21	3.5
	.3	Tomatoes	24	4.0
	.6	Orchards with cover	24	4.0
	.3	Orchards without cover	24	4.0
Group 11: Somewhat excessively drained loams and silt loams that are underlain by bedrock at depths of 12 to 15 inches.	.3	Truck group 1	12	2.0
Brandywine loam, 3 to 15 percent slopes, moderately eroded.	.3	Truck group 2	12	2.0
Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded.	.3	Truck group 3	12	2.0
Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded.	.3	Corn	12	2.0
	.3	Sweet corn	12	2.0
	.6	Alfalfa	12	2.0
	.6	Ladino clover	12	2.0
	.6	Grass mixture	12	2.0
	.3	Soybeans and sorghum	12	2.0
	.3	Tomatoes	12	2.0
	.6	Orchards with cover	12	2.0
	.3	Orchards without cover	12	2.0

[1] The maximum rate for the application of water applies only if conditions are ideal and soils are level or nearly level. The rate must be adjusted to suit site conditions—structure, slope, degree of erosion, cropping systems, and the history of the area to be irrigated.

[2] The figures for available moisture capacity are estimates and are intended to be averages for all soils of the group. There are some variations between soils within a group, particularly between soils that differ in slope and degree of erosion.

[3] The Chewacla, Lindside, and Rowland silt loams are only moderately well drained; artificial drainage is needed in most places to make these soils suitable for irrigation. These soils are not suited to alfalfa or orchards.

[4] The soils in groups 7 and 8 need artificial drainage to make them suitable for irrigation. They are not suited to alfalfa or orchards.

[5] The Chrome soils are well drained, but they have been placed in group 8 because (1) they have a heavy, almost impermeable subsoil that is close to the surface and (2) they are closely, and in places inseparably, associated with the Conowingo soils, which are typical of the group.

The sandiest soil in the county is the only soil in irrigation group 1. This soil can be irrigated at a rapid rate but will retain less moisture than the other soils in the county.

The one soil in irrigation group 2 has a sandy surface soil similar to that of the soil in group 1 but has a less sandy subsoil. Irrigation water should be applied more slowly on this soil than on the soil in group 1.

The soils in irrigation groups 3 and 4 are similar, except that those in group 3 are underlain by bedrock and those in group 4 are underlain by sand and gravel. The moisture-holding capacity of these soils is about the same, but the rate of application of water is different.

The soils in irrigation groups 5 and 6 generally are the best agricultural soils in the county. These soils, particularly those in group 5, are deep, and their moisture-holding and moisture-supplying capacities are high.

Irrigation group 5 consists of deep silty soils underlain by sand, silt, and gravel. These soils retain larger amounts of water than the sandier soils but must be irrigated more slowly. Some of the soils in this group are only moderately well drained and should be artificially drained if they are irrigated.

The soils in irrigation group 6 have a somewhat finer textured subsoil than the soils in group 5 and absorb water more slowly. Large amounts of water that can be used by crops are retained in these soils.

The soils in irrigation groups 7 and 8 are only moderately well drained and must be artificially drained if irrigated. These soils have a very slowly permeable hardpan or a clayey subsoil that limits the depth of the root zone and also the depth to which the soils can be irrigated. The available moisture-holding capacity is lower than that of the better agricultural soils, and the rate of applying water must be slower, particularly for the soils in group 8.

The soils in irrigation group 9 have a readily permeable surface soil and fairly good moisture-holding capacity, but they are relatively low in fertility and have a strongly cemented subsoil or substratum. Unless these soils can be made more productive by good management and fertilization, it is doubtful if irrigation would be economically feasible.

Irrigation group 10 consists of fairly shallow soils that are readily eroded. Water must be applied slowly to prevent further erosion. Bedrock is within 2 feet of the surface. These soils have a fairly high moisture-holding capacity, but the space available for water above bedrock is limited.

The soils in irrigation group 11 are even shallower to bedrock than those in group 10. There is little space for storing water within the root zone. These soils would have to be irrigated more slowly than the better agricultural soils and at much shorter intervals.

To summarize, the soils in groups 5 and 6 are the best agricultural soils for most purposes in the county. They can store large amounts of irrigation water and can be irrigated at moderate rates. These soils are probably the most suitable for economic irrigation farming.

The soils in groups 3, 4, 7, and 10 are also well suited to irrigation and will give good economic returns if irrigated.

Irrigation soil groups 1, 2, 8, 9, and 11 consist of soils that are rather low in fertility or are otherwise limited in their usefulness for crops. The irrigation of these soils may not be justified except for special crops or enterprises that will yield very high economic returns.

Soil groups for sewage disposal [3]

Suburban development in Montgomery County has been rapid and extensive. Some suburban developments are in areas beyond existing sewerage lines. In these areas it has been necessary to use septic tanks for sewage disposal.

Unfortunately, some septic tanks that were installed in dry weather and appeared to function properly failed to function after periods of heavy rainfall. Investigations disclosed that most of these failures occurred in areas where the soils were not well drained and where the subsoil was dense, compact, or fine textured. In wet weather, and for a long period afterwards, the soils were saturated; there was no space for outflow from septic tanks and the movement of effluent sewage was slowed or almost stopped.

Other failures occurred where the slopes were too steep, generally more than 8 percent; where soils were flooded by overflow from streams; or where the depth to the bedrock or to the cemented substratum was not sufficient for sewage disposal. Because failures on these areas could be more readily forseen, there have been fewer of them than on the poorly drained soils.

It is important that suburban developments beyond existing sewerage lines be in areas suitable for the installation of septic tanks. Areas not suitable should not be developed until sewerage lines are installed.

Various agencies cooperated to determine what soil characteristics should be observed prior to installing septic tanks. The soils of the county have been studied and grouped according to their general suitability for sewage disposal. By using this grouping in conjunction with the detailed soil map, it is possible to locate areas where septic tanks can be expected to function satisfactorily. However, a more intensive examination of the site should be made before septic tanks are installed.

Group 1.—The soils in this group are of good suitability for sewage disposal. They are well-drained upland soils that are predominantly deep and, except for the Lakeland soil, have slopes of not more than 8 percent. They are underlain by a deep, friable substratum, either of weathered rock or of unconsolidated sediments of the Coastal Plain. They are not subject to flooding. Water normally moves freely to a depth of 6 feet or more. Failures of septic tanks are few, if any, especially if individual tanks are used.

The soils in this group are—

Chester silt loam, 0 to 3 percent slopes.
Chester silt loam, 0 to 3 percent slopes, moderately eroded.
Chester silt loam, 3 to 8 percent slopes, moderately eroded.
Chester silt loam, 3 to 8 percent slopes, severely eroded.

[3] This section was written with the assistance of Dr. Robert L. Wrigley, Jr., chief, Project Planning Branch, Maryland-National Capital Park and Planning Commission, and members of his staff: George Allen, John Conway, Lewis Elston, and Douglas Pratt; and with the assistance of R. W. Koch, chief, Montgomery County Division of Sanitation.

Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded.
Elioak silt loam, 0 to 3 percent slopes.
Elioak silt loam, 3 to 8 percent slopes, moderately eroded.
Elioak silty clay loam, 3 to 8 percent slopes, severely eroded.
Elk silt loam, 0 to 3 percent slopes, moderately eroded.
Elk silt loam, 3 to 8 percent slopes, moderately eroded.
Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded.
Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded.
Glenelg silt loam, 0 to 3 percent slopes.
Glenelg silt loam, 3 to 8 percent slopes, moderately eroded.
Glenelg silt loam, 3 to 8 percent slopes, severely eroded.
Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded.
Manor silt loam, 3 to 8 percent slopes, moderately eroded.
Manor silt loam, 3 to 8 percent slopes, severely eroded.
Montalto silt loam, 3 to 8 percent slopes, moderately eroded.
Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded.
Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded.
Rumford loamy sand, 3 to 8 percent slopes, moderately eroded.
Sassafras loam, 3 to 8 percent slopes, moderately eroded.
Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded.
Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded.
Wickham silt loam, 0 to 3 percent slopes.
Wickham silt loam, 3 to 8 percent slopes, moderately eroded.

The Elioak, Elk, Montalto, Neshaminy, and Wickham soils have a finer textured subsoil than the other soils in the group and are less permeable. There should be no difficulty in the function of individual septic tanks, but some difficulty may develop if installations are concentrated.

The Glenelg soils are moderately deep and the Manor soils are shallow, but these soils have about the same suitability for sewage disposal as most of the other soils in this group.

Group 2.—The soils in this group are of fair suitability for sewage disposal. They are well-drained upland soils that are predominantly deep and are underlain by a deep, friable substratum, either of weathered rock or of unconsolidated sediments of the Coastal Plain. Because of the stronger slopes, the danger of downslope pollution is greater than on the soils in group 1, and the cost of excavating and grading is higher.

The soils in this group are—

Chester silt loam, 8 to 15 percent slopes, moderately eroded.
Chester silt loam, 8 to 15 percent slopes, severely eroded.
Edgemont gravelly sandy loam, 8 to 15 percent slopes. severely eroded.
Elioak silt loam, 8 to 15 percent slopes, moderately eroded.
Elioak silty clay loam, 8 to 15 percent slopes, severely eroded.
Elk silty clay loam, 8 to 15 percent slopes, severely eroded.
Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded.
Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded.
Glenelg silt loam, 8 to 15 percent slopes, moderately eroded.
Glenelg silt loam, 8 to 15 percent slopes, severely eroded.
Manor silt loam, 8 to 15 percent slopes, moderately eroded.
Manor silt loam, 8 to 15 percent slopes, severely eroded.
Manor soils, 8 to 15 percent slopes, very severely eroded.
Montalto silt loam, 8 to 15 percent slopes, moderately eroded.
Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded.
Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded.
Sassafras loam, 8 to 15 percent slopes, moderately eroded.
Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded.
Wickham silt loam, 8 to 15 percent slopes, moderately eroded.

The Elioak, Elk, Montalto, Neshaminy, and Wickham soils have a finer textured subsoil than the other soils in the group and are less permeable. They are less suitable for sewage disposal than the other soils in this group.

The Manor soils are shallow and the Glenelg soils are only moderately deep, but these soils have about the same suitability for sewage disposal as most of the soils in this group.

Group 3.—Because of steep slopes, the soils in this group are of poor to very poor suitability for sewage disposal. They are upland soils that are well drained and predominantly deep but have slopes of 15 percent or more. They are underlain by a deep, friable substratum, either of weathered rock or of unconsolidated sediments of the Coastal Plain. If large areas are available for sewage disposal, septic tanks might be successful. Generally, in selecting sites for septic tanks, these soils should be avoided.

The soils in this group are—

Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded.
Glenelg silt loam, 15 to 25 percent slopes, moderately eroded.
Glenelg silt loam, 15 to 25 percent slopes, severely eroded.
Glenelg soils, 25 to 45 percent slopes, moderately eroded.
Glenelg soils, 25 to 45 percent slopes, severely eroded.
Lakeland loamy sand, 15 to 25 percent slopes, severely eroded.
Manor silt loam, 15 to 25 percent slopes, moderately eroded.
Manor silt loam, 15 to 25 percent slopes, severely eroded.
Manor silt loam, 25 to 45 percent slopes, moderately eroded.
Manor soils, 15 to 25 percent slopes, very severely eroded.
Manor soils, 25 to 45 percent slopes, severely eroded.
Manor soils, 45 to 65 percent slopes.
Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded.
Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded.
Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded.

The Manor soils are shallow and the Glenelg soils are only moderately deep, but these soils have about the same suitability for sewage disposal as the other soils in this group.

Group 4.—The soils in this group are of poor to fair suitability for sewage disposal. They are well-drained, shallow to moderately deep, upland soils. The slopes do not generally exceed 8 percent. Because the bedrock or the compact coastal-plain deposit is usually within 3 feet of the surface, there is not sufficient space between the surface and bedrock or between the surface and the compact substratum for large amounts of effluent sewage. These soils are not susceptible to flooding.

The soils in this group are—

Bucks silt loam, 0 to 3 percent slopes.
Bucks silt loam, 0 to 3 percent slopes, moderately eroded.
Bucks silt loam, 3 to 8 percent slopes, moderately eroded.
Bucks silt loam, 3 to 8 percent slopes, severely eroded.
Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded.
Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded.
Chillum silt loam, 3 to 8 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded.
Croom gravelly loam, 3 to 8 percent slopes, moderately eroded.
Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded.

Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded.
Legore silt loam, 3 to 8 percent slopes, moderately eroded.
Legore silt loam, 3 to 8 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded.
Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded.
Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded.
Manor channery silt loam, 3 to 8 percent slopes, moderately eroded.
Manor channery silt loam, 3 to 8 percent slopes, severely eroded.
Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded.
Penn silt loam, 0 to 3 percent slopes, moderately eroded.
Penn silt loam, 3 to 8 percent slopes, moderately eroded.
Penn silt loam, 3 to 8 percent slopes, severely eroded.
Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded.
Stony land, Manor materials, 3 to 15 percent slopes.

If the disposal areas are much larger than are required in the soils in group 1, septic tanks may function successfully. However, there is some danger of polluting water supplies and other areas if these soils are oversaturated with sewage. The Bucks soils are somewhat less permeable than the other soils.

Group 5.—The soils in this group are of very poor suitability for sewage disposal. They are predominantly well drained and shallow to moderately deep, but the bedrock or the compact coastal-plain deposit is usually within 3 feet of the surface. Most of these soils have slopes of 8 to 15 percent.

The lateral movement of sewage waste through these soils may be rapid. Through seepage, the wastes could readily reach the surface and increase the hazard of pollution.

The soils in this group are—

Brandywine loam, 3 to 15 percent slopes, moderately eroded.
Brandywine loam, 3 to 15 percent slopes, severely eroded.
Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded.
Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded.
Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded.
Chillum silt loam, 8 to 15 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded.
Croom gravelly loam, 8 to 15 percent slopes, moderately eroded.
Croom gravelly loam, 8 to 15 percent slopes, severely eroded.
Eroded land, Penn materials.
Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded.
Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded.
Legore silt loam, 8 to 15 percent slopes, moderately eroded.
Legore silt loam, 8 to 15 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded.
Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded.
Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded.
Manor channery silt loam, 8 to 15 percent slopes, moderately eroded.
Manor channery silt loam, 8 to 15 percent slopes, severely eroded.
Penn silt loam, 8 to 15 percent slopes, moderately eroded.
Penn silt loam, 8 to 15 percent slopes, severely eroded.
Penn silt loam, 8 to 15 percent slopes, very severely eroded.
Rock land.

The Brandywine soils and Eroded land, Penn materials, have slopes of less than 8 percent, and Rock land has slopes and other characteristics that differ somewhat from most of the soils in this group; nevertheless, these areas have about the same characteristics for sewage disposal as the other soils in this group.

Group 6.—Steep slopes make these well-drained, shallow to moderately deep soils unsuitable for sewage disposal. The bedrock or a compact layer is usually within 3 feet of the surface.

The soils in this group are—

Brandywine loam, 15 to 25 percent slopes, moderately eroded.
Brandywine loam, 15 to 25 percent slopes, severely eroded.
Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded.
Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded.
Chillum silt loam, 15 to 25 percent slopes, moderately eroded.
Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded.
Croom gravelly loam, 15 to 25 percent slopes, moderately eroded.
Croom gravelly loam, 15 to 25 percent slopes, severely eroded.
Croom gravelly loam, 25 to 45 percent slopes, moderately eroded.
Croom gravelly loam, 25 to 45 percent slopes, severely eroded.
Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded.
Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded.
Gullied land, Penn materials.
Legore silt loam, 15 to 25 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded.
Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded.
Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded.
Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded.
Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded.
Linganore channery silty clay loam, 25 to 45 percent slopes moderately and severely eroded.
Manor channery silt loam, 15 to 25 percent slopes, moderately eroded.
Manor channery silt loam, 15 to 25 percent slopes, severely eroded.
Manor channery silt loam, 25 to 45 percent slopes, moderately eroded.
Manor channery silt loam, 25 to 45 percent slopes, severely eroded.
Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded.
Penn silt loam, 15 to 25 percent slopes, moderately eroded.
Penn silt loam, 15 to 25 percent slopes, severely eroded.
Penn silt loam, 25 to 45 percent slopes, moderately eroded.
Penn soils, 45 to 65 percent slopes.
Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded.
Stony land, Manor materials, 15 to 45 percent slopes.

The Chillum and Penn gravelly silt loams and Gullied land, Penn materials, have slopes of less than 15 percent but have about the same suitability for sewage disposal as the other soils in this group.

Group 7.—The soils in this group generally should not be used for sewage disposal. They are the soils on which

most septic-tank failures have occurred. They consist of poorly drained to moderately well drained soils on uplands and in depressions. Their slowly permeable to almost impermeable subsoil restricts the movement of water and causes the water table to be seasonally high. These soils are not subject to flooding.

The soils in this group occur in many small spots throughout the county but are dominant in the Conowingo-Aldino-Iredell soil association.

The soils in this group are—

Aldino silt loam, 0 to 3 percent slopes.
Aldino silt loam, 3 to 8 percent slopes, moderately eroded.
Aldino silt loam, 8 to 15 percent slopes, moderately eroded.
Aldino silt loam, 8 to 15 percent slopes, severely eroded.
Beltsville silt loam, 0 to 3 percent slopes, moderately eroded.
Beltsville silt loam, 3 to 8 percent slopes, moderately eroded.
Beltsville silt loam, 8 to 15 percent slopes, moderately eroded.
Calvert silt loam, 0 to 8 percent slopes.
Captina silt loam, 0 to 3 percent slopes.
Captina silt loam, 3 to 8 percent slopes, moderately eroded.
Chrome silt loam, 8 to 15 percent slopes, moderately eroded.
Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded.
Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded.
Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded.
Colluvial land.
Conowingo silt loam, 0 to 3 percent slopes, moderately eroded.
Conowingo silt loam, 0 to 3 percent slopes, severely eroded.
Croton silt loam, 0 to 8 percent slopes.
Glenville silt loam, 0 to 3 percent slopes.
Glenville silt loam, 3 to 8 percent slopes.
Glenville silt loam, 3 to 8 percent slopes, moderately eroded.
Iredell silt loam, 0 to 3 percent slopes.
Iredell silt loam, 3 to 8 percent slopes, moderately eroded.
Iredell silty clay loam, 3 to 15 percent slopes, severely eroded.
Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded.
Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded.
Readington silt loam, 0 to 3 percent slopes.
Readington silt loam, 0 to 3 percent slopes, moderately eroded.
Readington silt loam, 3 to 8 percent slopes, moderately eroded.
Roanoke silt loam, 0 to 8 percent slopes.
Urbana silt loam, 0 to 3 percent slopes.
Urbana silt loam, 3 to 8 percent slopes, moderately eroded.
Urbana silt loam, 8 to 15 percent slopes, moderately eroded.
Urbana silt loam, 8 to 15 percent slopes, severely eroded.
Watchung silt loam, 0 to 8 percent slopes.
Worsham silt loam, 0 to 8 percent slopes.

Group 8.—These soils are of poor suitability or are not suitable for sewage disposal. They are susceptible to flooding by stream overflow. The Ashton soils are well drained; they are under water only during major floods, which are infrequent. The Bermudian, Congaree, and Huntington soils are flooded occasionally but less frequently than the remaining soils in this group.

The soils in this group are—

Ashton silt loam, 0 to 3 percent slopes.
Ashton silt loam, 3 to 8 percent slopes, moderately eroded.
Bermudian silt loam, 0 to 3 percent slopes.
Bermudian silt loam, 3 to 8 percent slopes.
Bowmansville silt loam, 0 to 3 percent slopes.
Chewacla silt loam, 0 to 3 percent slopes.
Congaree silt loam, 0 to 3 percent slopes.
Huntington silt loam, 0 to 3 percent slopes.
Huntington silt loam, 3 to 8 percent slopes, moderately eroded.
Lindside silt loam, 0 to 3 percent slopes.
Melvin silt loam, 0 to 3 percent slopes.
Mixed alluvial land.
Rowland silt loam, 0 to 8 percent slopes.
Wehadkee silt loam, 0 to 3 percent slopes.

Use of the soil survey in community planning

Planning officials suggest that the county will benefit if a considerable part of the soils suitable for farming can be reserved for that purpose. Soils in capability classes I, II, and III are suitable for regular cultivation, although they have varying kinds and degrees of limitations and respond to different treatments. As a rule, the soils that are best for farming are also good for building sites. An orderly plan for land use is desirable.

In the section preceding this one, the soils have been grouped according to their suitability for disposal of sewage, especially of the outflow from septic tanks. This same grouping can serve other purposes in planning the uses of suburban land.

Soil groups 1, 2, and 4 in the list include most of the soils that make the best farm land. Some of the soils of group 5 also should be considered for permanent farming use as cropland or pasture. Some of the soils of group 8 also are valuable for farming, even though they are sometimes flooded. The Ashton, Bermudian, Congaree, and Huntington soils in group 8 are in capability class I because they have few limitations of any kind for production of crops.

In a suburban community, land is needed for public recreational uses. Within practical limits, some of the soils least valuable for farming should be reserved for parks and other public areas. Soils of groups 3, 6, and 7 and some of those in group 8 could be used to good advantage for parks and recreation.

The sloping and steep soils of groups 3 and 6 are almost ideal for parks and other recreational uses. Some of the steep soils are eroded, and many areas are in woods. Neither the steep hillsides nor the adjoining narrow bottom lands are well suited to use as farms or as building lots. Rock Creek Park, especially that part in the adjoining District of Columbia, is an excellent example of good use of land that is generally not suited to farming or building purposes.

Parks should be kept in forests, insofar as possible. Few trees need to be cleared, and many areas might be reforested. Reforestation will increase the esthetic values, and also will help to retard excessive runoff, control erosion, and prevent flooding. Protective vegetation is especially valuable on the highly erodible soils of group 3.

It has been shown in the discussion of sewage disposal that the soils of group 7 have very slowly permeable subsoils and tend to be fairly wet at times, sometimes for a large part of the year. With good surface drainage and careful disposal of surface water, these soils can still be used as residential sites, provided a complete sewage disposal system is installed, so the owners do not depend on septic tanks that have little chance to function properly. The soils of group 7, particularly those that are in scattered small areas, can be used for small community parks.

The soils of groups 4, 5, and 6 are rather shallow to hard, undisturbed bedrock or to a compact or cemented gravelly substratum. These soils, particularly those underlain by bedrock, will furnish excellent foundations or footings for industrial plants or other heavy buildings.

In any area, the cost of revegetating or otherwise stabilizing cuts, fills, road banks and shoulders, and other

disturbed places can be an important item. One of the columns in table 6 indicates the general suitability of topsoil that can be obtained from each of the soils. Use of good topsoil helps in the difficult task of establishing protective vegetation on disturbed areas.

Formation and Classification of Soils

Soils are the products of soil-forming processes acting on materials deposited or accumulated by geologic forces. The important factors in soil formation are parent material, climate, living organisms (particularly vegetation), topography, and time.

Factors of Soil Formation

Climate and living organisms, particularly vegetation, are the active forces in soil formation. Their effect on the parent material is modified by topography and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. Occasionally one factor dominates and fixes most of the properties of the soil, but normally the interaction of all five factors determines what kind of soil develops in any given place.

Parent material

The soils of Montgomery County developed from two general kinds of parent material. The more extensive is residuum formed by the weathering of rocks in place. The other consists of sand, silt, clay, and rock fragments transported by water, wind, or gravity or a combination of these forces.

The residual material was derived from several different kinds of rocks. About one-sixth of the county is underlain by sedimentary rocks. The red shale and sandstone in the western part of the county are unaltered sedimentary rocks of Triassic age. The Bucks, Penn, Lewisberry, Readington, and Croton soils developed from material weathered from these rocks. These soils have inherited the red color of the parent rocks, but in the Croton soils the color has changed as a result of poor drainage and poor aeration.

A small part of the county is underlain by quartzite, which is a sedimentary rock that has been metamorphosed by heat, pressure, and movement. The Edgemont soils developed from material weathered from quartzite.

Igneous rocks underlie the rest of the areas of residual soils. Diabase, granodiorite, serpentine, and gabbro are unaltered igneous rocks. The Montalto, Legore, Neshaminy, Aldino, Chrome, Conowingo, Iredell, Calvert, and Watchung soils have developed from material weathered from these rocks.

Gneiss, granite gneiss, and metaigneous schist are metamorphosed igneous rocks. There are several kinds of metaigneous schist in the county: granitized schist; soft micaceous (chloritic and muscovitic) schist; chloritic and muscovitic slate; hard, blue to purple, slaty and phyllitic metaandesite and metarhyolite; and gray, blue, green, and violet actinolite and sericitic schist. Soft micaceous schist underlies most of the county. Residuum weathered from it contributed parent material for the Manor, Chester, Elioak, Glenelg, Glenville, and Worsham soils. Part of the parent material of the Manor, Glenelg, Glenville, and Worsham soils was derived from chloritic and muscovitic schist; and some of the material from which the Neshaminy and Glenelg soils developed was weathered from granite gneiss and granitized schist. The Brandywine soils developed from material weathered from gneiss; the Linganore soils developed from residuum weathered from metaandesite and metarhyolite; and the Urbana soils developed from material derived from actinolite and sericitic schist.

The transported material consists of alluvium deposited on flood plains and terraces, on the Coastal Plain along the Prince Georges County line, and within the big bend of the Potomac River in the western part of the county.

The Bermudian, Rowland, Bowmansville, Congaree, Chewacla, Wehadkee, Huntington, Lindside, and Melvin soils of the flood plains developed from the most recent alluvial deposits. The Ashton, Elk, Captina, Wickham, and Roanoke soils of the terraces developed from older deposits. From the coastal-plain deposits in the eastern part of the county the Lakeland, Rumford, Sassafras, Croom, Chillum, and Beltsville soils developed. The alluvium in the western part of the county overlies Triassic rock and has become mixed with residuum. In some spots the Chillum soils, which developed from the gravelly deposits, and the Penn soils, which developed from residuum, are so mixed that they are not separated on the soil map.

There is some evidence that some of the finer grained material was transported by wind. A silty mantle covers some areas in the county, both on the Coastal Plain and in the Piedmont. It is particularly evident in the Beltsville soils and in some areas of Elioak, Chester, and Neshaminy soils. Two of the sandiest soils of the Coastal Plain, the Lakeland and the Rumford, have a dunelike topography, so it is assumed that the parent material was either transported or reworked by wind.

The parent material of the soils of Montgomery County ranges from very young to very old. The alluvium deposited on the flood plains during Recent geologic time is the youngest. New material is added to these deposits yearly by floods. Slightly older is the material on the terraces along the major streams; it was deposited during the Pleistocene epoch. Most of the alluvium on the Coastal Plain was deposited during the Cretaceous period. The red shale and sandstone that supplied the parent material for many of the soils in the western part of the county originated during the Triassic period. The igneous rocks of the Piedmont Plateau, from which the parent material of most of the soils of the county was derived, are very old. Their exact age is uncertain (*4*, *5*), but all are probably Precambrian.

Climate

Montgomery County has the temperate, rather humid climate that is typical of the Middle Atlantic States. The average temperatures and the distribution of rainfall are given in table 8, page 99. The climate is fairly uniform throughout the county. There are no significant differences in elevation, no obstructions to the movement of winds, clouds, and rainstorms, and no climatically significant bodies of water. Although Chesapeake Bay

is only about 30 miles to the east, and the Atlantic Ocean only about 100 miles, they have little effect on the climate, because the dominant air-mass movements are from the north and west.

Humid, temperate climates are usually associated with strongly weathered, leached, acid soils of low fertility. This is the case in Montgomery County. In many places the rocks have been weathered to great depths because they have been exposed to climatic forces for a long time. The only rocks not deeply weathered are those that are highly resistant to weathering. The soils in the county have no free carbonates. A large percentage of the bases has been leached out. All of the soils are acid and most of them are strongly acid. The natural ferility is low to moderate.

Vegetation

The original vegetation in Montgomery County was a dense forest of hardwoods. Oaks were dominant; yellow-poplars, hickories, maples, and dogwoods were also numerous. Conifers were probably uncommon in the original forest.

Most hardwood trees use large amounts of calcium and other bases available in the soils. Soils that are normally high in bases remain so under a cover of deciduous trees, because a large proportion of the bases is returned to the soil each year when the leaves fall. However, the soils in Montgomery County were never high in bases; consequently, they are acid, even under a hardwood forest.

Clearing, cultivation, the introduction of new plants, and artificial drainage will affect future soil development. So far, the only apparent results of these activities of man are accelerated erosion and the alteration of the surface soil by tillage and the application of lime and fertilizer.

Topography

Most of Montgomery County is on the very old, strongly weathered, eroded peneplain that is generally known as the Piedmont Plateau. The peneplain is composed almost entirely of igneous rocks. In the western part of the county there is superimposed on the peneplain a large area of sedimentary Triassic shale and sandstone. The eastern fringe of the county is on the Coastal Plain.

On the Piedmont Plateau, the topography is generally rolling. The Triassic area is less weathered and less strongly dissected than the rest of the Piedmont area, and is generally sloping instead of rolling. The coastal-plain area is strongly dissected but includes some smooth, gently sloping interfluves and a few small, dunelike, sandy spots.

The entire county slopes from the north and west toward the south and east. The highest point in the county is 846 feet above sea level, at Damascus. The lowest point is about 60 feet above sea level, where the Potomac River flows from Montgomery County into the District of Columbia. Most of the county is between 300 and 600 feet above sea level.

Differences in topography can account for the development of different soils from the same kind of parent materials. This can be illustrated by comparing the Bucks, Penn, Readington, and Croton soils, all of which developed from residuum weathered from red Triassic shale. The Bucks soils are well drained and fairly deep; they developed where the slope was not so strong as to encourage erosion and not so nearly level as to prevent runoff. The Penn soils are shallow and somewhat excessively drained, and they contain much partly weathered shale. They developed where the slope was strong enough so that the soil was removed almost as fast as it formed. The Readington soils are moderately well drained and have a pan in the subsoil. They developed where the topography was so nearly level that there was little runoff and, consequently, much of the rainfall percolated downward through the soil. The percolating water carried clay particles down and deposited them in the lower part of the soil. The Croton soils are poorly drained and have a pan in the subsoil. They developed in depressions.

Time

The length of time the parent material has been in place and exposed to the active forces of climate and vegetation is an important factor in soil formation, but the age of a soil refers to its degree of profile development and is influenced by other factors as well as by time. A mature soil is one that has well-defined, genetically related horizons; an immature soil is one that shows little or no horizonation. Because of differences in topography and parent material, soils that have been developing for about the same length of time will not necessarily have reached the same stage of profile development. If the parent rock is resistant and weathers slowly, profile development is slow. If the slope is steep, soil is removed almost as soon as it forms and, consequently, no well-defined horizons develop. On flood plains, frequent deposition of fresh alluvium prevents the development of a distinct profile.

The Chester soils in Montgomery County are examples of mature soils; in them, the rate of weathering somewhat exceeds the rate of geologic erosion. The Brandywine soils are immature; in them, the rate of weathering of the resistant material is slow and is exceeded by the rate of geologic erosion. The Huntington soils are immature because their parent material is continually renewed.

Morphology of Soils

Most of the soils of Montgomery County have strong horizonation. The exceptions are some of the alluvial soils and one particular soil that developed from almost pure quartz sand.

The differentiation of horizons in the soils of the county is the result of several soil-forming processes. The most important of these are the following: (1) Accumulation of organic matter, (2) leaching of carbonates and salts more soluble than calcium carbonate, (3) chemical weathering of the primary minerals of rocks and parent materials into silicate clay minerals, (4) translocation of the silicate clay minerals, and probably of some silt-sized particles, from one horizon to another, and (5) chemical change and transfer of iron. In all soils in the county, these processes have taken place. The degree of activity or strength of each process, however, varies from soil to soil.

In all of the soils, some organic matter has accumulated to form an A_1 horizon. The A_1 horizon may have lost its identity as a result of plowing and cultivation and may have become an A_p horizon or part of an A_p horizon. In severely eroded areas, the A_1 horizon may be gone. The quantity of organic matter accumulated varies from very low to moderately high. Lakeland loamy sand has a very weak A_1 horizon that contains very little organic matter, but Melvin silt loam has a prominent A_1 horizon that is 4 to 5 percent organic matter.

Leaching of carbonates and salts has occurred in all of the soils, but it has been of very little importance in horizon differentiation. The effects have been indirect; the leaching permitted translocation of silicate minerals in most of the soils. Most of the soils are deeply leached of carbonates and salts. This is reflected in the fact that all soils of the county are acid, and most of them strongly acid.

The main result of the weathering of primary materials to silicate minerals, largely by the processes of hydrolysis, is the production of kaolinite clay (*2*). While kaolinite is the most characteristic clay mineral in mature soils of the area, other clay minerals, including halloysite, vermiculite, illite, and montmorillonite, occur in many of the soils. This shows that, although the minerals have been exposed to weathering for a long time, the weathering processes have not yet had their full effect. They may, however, have reached a point where the soils are in at least temporary equilibrium with the environment.

The translocation and development in place of these silicate clay minerals have had a strong influence on the development of horizons in most of the soils of the county. Clay has been removed in part from the A_1 and A_2 horizons and has become immobilized, or nearly so, in the B horizon. This is true of all soils that have a textural B horizon, and probably of some soils that do not have a distinct textural B horizon. It is most evident in soils that have a heavy B_2 horizon, such as the Elioak, Montalto, Wickham, Iredell, Conowingo, and others.

The reduction and transfer of iron has occurred to some degree in all soils that have impeded drainage. In the many naturally wet soils of Montgomery County, this process, which is known as gleying, has been of very great importance. It has particularly affected the soils of the Worsham, Croton, Watchung, Roanoke, Bowmansville, Wehadkee, and Melvin series.

In nearly level soils, there is likely to be excessive accumulation of clay minerals and of silt in the subsoil. This brings about the formation of a compact layer, usually a part of the B horizon, commonly called a fragipan. This pan is the result of the translocation and accumulation of silt and clay. It is one of the causes of impeded drainage, which in turn brings about the reduction and transfer of iron, or gleying. The Glenville, Urbana, Readington, Captina, Beltsville, and Leonardtown soils all have fragipans and are moderately gleyed.

Iron that is reduced under conditions of poor aeration usually becomes mobile. It may be removed from the soil entirely, but in the soils of Montgomery County it has commonly been moved only a short distance and may have stopped either in the horizon where it originated or in another nearby horizon. Part of this iron may be reoxidized and segregated to form the yellowish-red, strong-brown, or yellowish-brown mottles common in the gleyed horizons of all soils that have impeded drainage.

In the formation of silicate clays, some iron is usually freed as a hydrated oxide. Depending upon the degree of hydration, these oxides are more or less strongly red in color. A small amount of these oxides is sufficient to color a soil, particularly if silicate clay minerals are not abundant and if the parent material from which the soil formed is fairly coarse textured. Under these conditions a strongly colored subsoil, or a "color B" horizon, forms, even if there has not been enough accumulation of clay minerals to form a textural B horizon. In most well-developed and oxidized soils, however, the subsoil is made up of a textural B horizon that is as strongly colored as a color B horizon. Manor silt loam is the most extensive and important soil in Montgomery County that has only a color B horizon and little or no textural B horizon.

Classification of Soils by Great Soil Groups

Soils are placed in narrow classes to facilitate the organization and application of knowledge about their use and management on individual farms. They are placed in broad, inclusive classes to facilitate study and comparison of large areas, such as countries or continents. In the comprehensive system of soil classification which has been followed in the United States (*10*), the soils have been placed in six categories. Beginning with the most inclusive category, these are the order, suborder, great soil group, family, series, and type.

There are three orders and thousands of types. The concepts of suborder and family have never been fully developed. The type and the series are the categories most commonly used in discussing the soils of a county or other small area. Series that are alike in fundamental characteristics are classified as one great soil group.

The great soil groups that are presently recognized in Montgomery County are Gray-Brown Podzolic soils, Red-Yellow Podzolic soils, Sols Bruns Acides, Planosols, Low-Humic Gley soils, Alluvial soils, Lithosols, and Regosols. Many of the soils of Montgomery County do not fit the modal or central concept of any one great soil group. These soils, which are called intergrades, have enough characteristics of a given great soil group to be included in that group, but they have one or more characteristics of another group.

Gray-Brown Podzolic soils

About half of all the soil series of Montgomery County are dominated by characteristics of the great soil group known as Gray-Brown Podzolic soils. These soils are typical of forested, humid, temperate regions. In the natural state, a true Gray-Brown Podzolic soil has a fairly thin leaf litter and a rather thin humus layer over a dark-colored mineral surface soil. There is a grayish-brown leached subsurface horizon over a moderately heavy, blocky, essentially brown B horizon. The B horison may be brown, yellowish brown, brownish yellow, or reddish brown. The profile is moderately thick to thick, and the reaction is usually slightly acid to neutral.

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There are no true Gray-Brown Podzolic soils in Montgomery County. However, there are 20 series in the county that are classified as Gray-Brown Podzolic soils but have some characteristics of other groups.

The Bucks, Chester, Chillum, Conowingo, Edgemont, Elk, Glenelg, Glenville, Readington, Rumford, Sassafras, and Wickham series consist of Gray-Brown Podzolic soils that have some of the characteristics of the Red-Yellow Podzolic soils. They are somewhat more strongly leached than the true Gray-Brown Podzolics. The A_2 horizon is more strongly bleached, and the B horizon is more red or yellow and less brown. And these intergrades are characteristically more acid throughout than the modal Gray-Brown Podzolic soils.

The soils of the Ashton series have a weak textural B horizon. They are Gray-Brown Podzolic soils intergrading to Alluvial soils.

One series in the county differs from the modal Gray-Brown Podzolic concept only in that drainage has been partially impeded. It has the color profile and other characteristics of the modal concept, but the lower part of the subsoil (B_{22} horizon) is rather tight and is somewhat mottled because of imperfect aeration or oxidation. This is the Urbana series. The Urbana soils are Gray-Brown Podzolic soils intergrading to Low-Humic Gley soils. The Aldino and Beltsville series are Gray-Brown Podzolic soils that have a fragipan or a heavier B horizon than is normal for the group and a rather abrupt change in texture between the surface soil and the subsoil. They are intergrades to Planosols. They are less well drained than typical Gray-Brown Podzolic soils because of their slowly permeable subsoil.

The soils of the Chrome, Legore, Linganore, and Penn series are not deep enough and have a too thin and too weakly expressed solum to be true Gray-Brown Podzolic soils. They are intergrades to Lithosols.

Red-Yellow Podzolic soils

The central concept of this group is that of well-developed, well-drained, acid soils that have a thin organic-mineral A_1 horizon, a light-colored, bleached, leached A_2 horizon, and a red, yellowish-red, reddish-yellow, or yellow, much finer textured B horizon. The parent material was commonly, though not invariably, more or less siliceous and, where thick, is commonly marbled or otherwise variegated. The chroma in the B horizon is high, usually above six. The reaction is acid.

The Elioak soils are the only true Red-Yellow Podzolic soils in Montgomery County. They have a thin A_1 horizon, a fairly thick, leached A_2 horizon, and an intensely red B_2 horizon, and they are strongly acid in the lower subsoil.

The Captina soils are Red-Yellow Podzolic soils intergrading to Planosols. They have an evident fragipan in the subsoil.

The soils of the Montalto and Neshaminy series are intergrades to the Reddish-Brown Lateritic group. The B horizon of these soils closely resembles that of Reddish-Brown Lateritic soils. It is red to dark red, very fine textured, and presumably contains free sesquioxides. Although fine textured, it is porous, and the soils are well drained.

Sols Bruns Acides

Sols Bruns Acides have a weak A_1 horizon and a very weak A_2 horizon or none at all. The B horizon is differentiated almost entirely by color, and its clay content is only slightly greater than that of the horizons above and below. By definition, the B horizon is redder than and higher in chroma than the A and C horizons. Also, there is little structural development or differentiation. These soils have a very low degree of base saturation and are usually very strongly acid.

Sols Bruns Acides are represented in Montgomery County by two series that are typical of this central concept. These are the Lewisberry and Manor series.

Planosols

The great soil group known as Planosols is defined as a group of soils having one or more horizons abruptly separated from and sharply contrasting to an adjacent horizon because of cementation, compaction, or high clay content (*9*).

There are five such soil series in Montgomery County, the Calvert, Croton, Iredell, Leonardtown, and Watchung. Each has a dense B horizon that impedes drainage. The Calvert, Croton, and Watchung soils have a clay B horizon and are poorly drained; the Leonardtown soils have a dense silty clay B horizon and are somewhat poorly to poorly drained.

Low-Humic Gley soils

This great soil group is characterized by poorly drained soils having a thin surface horizon that is moderately high in organic matter and a mottled or partially gleyed mineral subsoil. Most Low-Humic Gley soils have some textural differentiation between horizons. There has been moderate illuviation and, in many places, surface accumulation of fine materials washed in from adjacent higher areas.

There are five series in Montgomery County that fit the central concept of Low-Humic Gley soils. These are the Bowmansville, Melvin, Roanoke, Wehadkee, and Worsham. The soils of these series are strongly acid. They are wet much of the year because of a very slowly permeable subsoil or a high water table or both. In spite of their wetness, they do not have a high moisture-supplying capacity. This is because the slowly permeable subsoil not only impedes downward percolation of water but also inhibits upward capillary movement of water.

Alluvial soils

Alluvial soils consist of deposits of recent alluvium on flood plains. They have very little if any horizonation or other significant observable effects of true soil-forming processes. While they are composed of "soil" in the general agricultural sense, they are little more than parent material in the genetic sense, even though the soil particles may once have been part of genetic soils at other locations.

The Bermudian, Chewacla, Congaree, Huntington, Lindside, and Rowland series are Alluvial soils. The Bermudian, Congaree, and Huntington soils are deep and well drained. They have practically no horizonation except for some slight increase in organic matter near the

surface; they have no impediment to drainage; and they have a high moisture-supplying capacity.

The Chewacla, Lindside, and Rowland soils are only moderately well drained. Because the water table is high for fairly large parts of the year, there is some evidence of slight gleization in the lower part of the subsoil. These soils are, nevertheless, within the central concept of the group.

Lithosols

Lithosols have an incomplete solum or no clearly expressed soil morphology; they consist of an imperfectly weathered mass of rock or rock fragments. They are usually confined to steeply sloping areas.

Only one series in Montgomery County belongs to this group. This is the Brandywine. It has a very thin, very weak A horizon and no true B horizon at all. The unweathered parent rock is at a depth of only 15 inches.

Regosols

Regosols may be defined as deposits of relatively unweathered rock or mineral material that are well drained to excessively drained and that show practically no evidence of genetic soil development. This may be either because the materials are too new to have had time for soil development, or because they are too resistant to weathering to show any appreciable effects of soil development processes, regardless of time. The first instance might be represented by fresh deposits of volcanic ash, and the second by dune deposits of pure quartz sand.

In Montgomery County, there is one soil series that fits the general definition of a Regosol. This is the Lakeland series. The Lakeland soils consist largely of quartz sand. However, the surface has been slightly darkened by a slight accumulation of organic matter. The subsurface layer is pale, thick, strongly leached, and very strongly acid, although there was never more than a trace of weatherable material to be leached away. Weathering has had so little effect that this soil cannot be said to intergrade toward any genetic great soil group.

The Croom soils commonly have a weak textural B horizon. They are Regosols intergrading to Red-Yellow Podzolic soils.

General Information About Montgomery County

The total area of Montgomery County, excluding the water surface of the Potomac River, is 316,160 acres. The Potomac, where it forms the boundary between Maryland and Virginia, is politically part of the county. The greatest distance from north to south in the county is about 29 miles. The greatest distance from east to west is about 34 miles.

The county is divided into 13 townships, or election districts. Rockville, the county seat, is near the geographic center of the county (see fig. 1, page 1). Washington, D.C., and Baltimore are the principal markets for agricultural products of the county. The greatest density of population in the county is in areas adjacent to the District of Columbia, particularly Silver Spring and Takoma Park.

Settlement and Population

Montgomery County is part of an original grant of land to Lord Baltimore. It was opened to settlement in 1730. Many of the first settlers were English, or of English descent, and came from the tidewater areas of Maryland and Virginia. Most of the area in the vicinity of Sandy Spring was settled by Friends. Originally, the county was part of Frederick County. Montgomery County was established in 1776.

In 1910 the population was 32,089. It consisted mostly of descendants of the original settlers. By 1940 the population had increased to 83,912. It doubled in the next 10 years and in 1950 was 164,401. An official estimate in January 1958 showed a population of 317,656, or an increase of 92 percent in 8 years (*7*). The greater part of the increase, particularly since 1940, has been in areas near the District of Columbia.

The density of the population adjacent to the District of Columbia is best exemplified by the election districts of Wheaton and Bethesda. These two districts occupy less than 10 percent of the area of the county but, as of January 1, 1958, had populations of 156,421 and 74,711, respectively, or 73 percent of the population of the county (*7*). Less than 20,000 of the 231,132 persons in these two districts live in incorporated communities. The remainder live in densely populated unincorporated areas, of which Silver Spring, Bethesda, and Wheaton are the most populous.

According to the population statistics already cited, Rockville had a population of 23,940 in 1958. Besides being the political center of the county, Rockville is the economic center of the rural or nonurban sections. Silver Spring is undoubtedly the economic and commercial center of the county as a whole.

Some of the principal incorporated towns and their population are the following:

	Population
Takoma Park	12,348
Gaithersburg	2,958
Kensington	2,254
Chevy Chase Village	2,078
Chevy Chase	1,951
Garrett Park	1,285
Somerset	1,258

More indicative of the population distribution in the county is the population by election districts (*7*):

	Population
Barnesville	2,246
Bethesda	74,711
Clarksburg	3,057
Colesville	17,861
Damascus	4,165
Darnestown	3,434
Gaithersburg	7,525
Laytonsville	2,186
Olney	5,156
Poolesville	1,953
Potomac	3,832
Rockville	35,109
Wheaton	156,421

Physiography

Most of Montgomery County is in the Piedmont Plateau physiographic province. The rest, which consists of a very small area along the Prince Georges County line and adjacent to the District of Columbia, is in the upper Atlantic Coastal Plain (*8*).

The Piedmont Plateau is an old peneplain dissected by many small streams. It is composed mainly of schistose metamorphosed rocks of both igneous and sedimentary origin, but some of the westernmost parts are a Triassic upland of shale and sandstone. The topography is rolling. The elevation ranges from a little less than 200 feet in the southern part to nearly 700 feet in the vicinity of Damascus (*4*). There are no mountains in the county.

Drainage

Montgomery County is entirely within the watershed of Chesapeake Bay. Drainage is mostly southward toward the Potomac River, but the northeastern section of the county is drained eastward by the Patuxent River. Both the Potomac and the Patuxent eventually discharge into Chesapeake Bay.

The main tributaries of the Potomac River in Montgomery County are Bennett and Little Bennett Creeks, Wildcat Branch, the Little Monocacy River, Broad Run, Horsepen Branch, Seneca Creek, Muddy Branch, Sandy Branch, Watts Branch, Rock Run, Cabin John Creek, Little Falls Branch, and Rock Creek. Sligo Branch, Paint Branch, Northwest Branch, and Little Paint Branch are forks of the Anacostia River, which drains into the Potomac River.

The principal streams that drain into the Patuxent River are Scott Branch, Haights Branch, and the Hawlings River.

The county is well drained. It has no swamps, and only about 9 percent of the area is occupied by poorly drained soils. About 8 percent is occupied by somewhat poorly drained and moderately drained soils, and the remaining 83 percent by soils that are well drained and excessively drained.

The amount of runoff is one measure of the general drainage of the county. It is calculated by stream-gaging stations. The average runoff reported by 14 stations for a 4-year period, 1949 through 1952, was about 818,000 gallons per square mile per day. The average runoff for that period was 13 percent higher than for the period 1945 through 1952 and 17 percent higher than for the period 1930 through 1952. Current runoff is estimated to be at least 10 percent higher than the average for the last 50 years (*6*).

It is doubtful if the higher rate of runoff has been caused by the clearing of soils, because agriculture generally is decreasing in the county. The most logical explanation is that suburban expansion is accompanied by the construction of high-runoff surfaces—pavements, sidewalks, and roofs—and by the construction of sewers and other drains that remove water that once would have penetrated the soil.

Water Supply

Runoff in Montgomery County averages about 1,280 gallons of water per acre per day (*6*). This shows that the supply of water is ample for all domestic and commercial uses, provided the water can be stored until needed.

The amount of water that can be stored underground depends on the porosity of the underlying rocks. Most of Montgomery County is underlain by hard, unweathered, crystalline rocks of low porosity. Because of this, in long dry periods the water table may fall so low that the yield from shallow wells and springs decreases. There have been no significant changes in the yields from wells in many years (*5*).

In an area underlain by any given kind of rock, the yields from wells range from very low to high. The highest yield recorded, which is from a well in schistose rock, is 183 gallons per minute. In most areas underlain by schistose rock, however, the average yield is about 20 gallons per minute. Wells in other kinds of crystalline rock yield, on the average, about 11 gallons per minute. Wells in sandstone and shale average about 10 gallons per minute. Those in unconsolidated sediments in the eastern part of the county yield about 14 gallons per minute.

A detailed summary of well records in Montgomery County has been published by the Maryland Department of Geology, Mines, and Water Resources (*5*).

Rockville is the only community of any size in the county that uses local ground water as a source of supply. Most other large communities obtain water from the lines of the Washington Surburban Sanitary District. In 1952 Rockville pumped about 750,000 gallons of water per day for its estimated population of 12,000 (*5*). At the same rate, water consumption for the estimated population in 1958 (*7*) would have been more than 1,312,000 gallons per day.

Many schools and some other institutions in Montgomery County use wells for water supplies. Some U.S. Government institutions and installations are equipped with wells for auxiliary water supplies or for air conditioning, but their main supply is from the lines of the Washington Suburban Sanitary District.

Climate

Montgomery County has a humid, temperate, continental climate. Summers are rather warm. Winters are moderately severe.

Climatic data recorded at the official weather station at Boyds is summarized in table 8. As this station is centrally located in the county and there are no abrupt changes in topography, the data in table 8 are fairly representative of the rest of the county. The northern part gets slightly more snowfall than the southern part and has slightly lower temperatures in winter.

The difference between the average summer and average winter temperatures is about 40° F. Normally, temperatures in summer do not go above 95°, and temperatures in winter do not go below about 15°, but extremes of 106° and −17° have been recorded. Although sum-

mer temperatures are usually moderate, there may be periods of several days when the maximum temperature is above 90° F.

TABLE 8.—*Temperature and precipitation at Boyds, Montgomery County, Md.*

[Elevation, 580 ft.]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1930)	Wettest year (1952)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	35.7	72	−4	2.62	2.54	2.96	3.1
January	33.1	78	−17	3.04	2.40	3.96	5.6
February	34.6	80	−14	2.59	1.73	1.86	5.9
Winter	34.5	80	−17	8.25	6.67	8.78	14.6
March	43.4	87	0	3.08	2.40	4.55	3.8
April	52.5	94	11	3.18	3.20	7.86	.4
May	62.6	97	29	3.52	1.15	5.92	(3)
Spring	52.8	97	0	9.78	6.75	18.33	4.2
June	71.3	102	35	3.73	2.86	4.89	0
July	75.2	106	45	3.47	.33	3.13	0
August	73.6	106	41	4.12	.82	9.19	(3)
Summer	73.4	106	35	11.32	4.01	17.21	0
September	68.0	102	31	3.31	.60	5.12	0
October	56.0	97	19	3.11	.29	1.17	.2
November	45.6	86	2	2.73	.78	6.25	.7
Fall	56.5	102	2	9.15	1.67	12.54	.9
Year	54.3	106	−17	38.50	19.10	56.86	19.7

[1] Average temperature based on a 30-year record, through 1950; highest and lowest temperatures on a 29-year record, through 1952.
[2] Average precipitation based on a 32-year record, through 1952; wettest and driest years based on a 29-year record, in the period 1920–52; snowfall based on a 29-year record, through 1952.
[3] Trace.

Normally, winter crops receive little protection from snowfall but, except for those on wet soils, are seldom damaged by cold.

The average frost-free period at Boyds is 174 days. The average date of the last spring frost is April 29, and the average date of the first fall frost is October 20. The latest frost recorded in spring was on May 16, and the earliest in fall was on October 8. The grazing period normally extends from about April 15 to November 15.

Periods of dry weather that last from several days to three weeks or more may occur, especially in midsummer. In these periods, crops may be severely damaged by lack of water, particularly those on the lighter textured, shallower soils. A severe drought in 1957 caused drastic reductions in crop yields. Irrigation systems would be of great value in such emergencies.

Wet periods affect soils that are not well drained, particularly the Readington, Croton, Glenville, and Beltsville soils. Wetness not only delays seeding and germination of seed in spring but also interferes with other farm operations, such as harvesting small grain in summer.

Most creek bottoms are flooded at least once in spring and occasionally in other seasons. After the danger of spring flooding is past, the well-drained soils of the bottom lands are suitable for most crops. Other soils of the bottom lands may be too wet for most crops but can be used for pasture.

Most rains in winter, spring, and fall are slow and steady. Heavier showers that occur late in spring or when snow is melting increase the danger of flooding on bottom lands. In summer some thundershowers are very intense. Hurricanes have caused some damage in Montgomery County. The storm of August 23, 1933, probably caused the most widespread damage. On that date 7.62 inches of rainfall in 24 hours was recorded at Baltimore and 6.40 inches at Washington, D.C. (*6*).

Vegetation

The natural vegetation of Montgomery County is mainly hardwood forest. These forests are dominated by oak, chiefly white and red oaks.

Hardwood forests once covered the entire county, but now comparatively few areas remain in forest, and most of these have been cut over for nearly three centuries. Areas of abandoned cropland and pasture are being reforested with hardwoods and pines. Virginia pine has become dominant in areas where the soils are shallow, somewhat droughty, very strongly acid, and low in fertility. There are no savannahs, prairies, or swamps in the county.

Additional information about the vegetation in the county is in the subsection, Forests of the County, and the section, Formation and Classification of Soils.

Industries, Transportation, and Markets

Montgomery County is essentially rural and residential. Most nonagricultural areas are suburban and residential rather than commercial or industrial. There are no important heavy industries. Some science industries, principally electronics, are expanding, but commerce and industry other than agricultural are almost entirely in goods and services for the expanding population.

There are two Federal highways in the county. U.S. Highways Nos. 570 and 240 extend from Washington, D.C., through Rockville toward Frederick. U.S. Highway No. 29 traverses the eastern part of the county and extends northward from Washington, D.C., toward Baltimore.

Within the county there are many miles of excellent State highways and several hundred miles of county roads, most of which are paved. Unpaved roads have hard, gravel surfaces and are well maintained. There are few public thoroughfares that are not all-weather roads. Except in some extremes of weather, nearly all farms have easy access to markets and to the county seat.

Local and interstate buses serve communities along most of the main highways. In suburban areas, there is extensive local bus service and some rail service for commuters to and from Washington, D. C., but the most

common means of transportation is the private automobile.

The Baltimore and Ohio Railroad has a line from Washington, D.C., through Silver Spring, Kensington, Garrett Park, Rockville, Gaithersburg, Germantown, Boyds, Barnesville Station, and Dickerson. It crosses into Frederick County close to the Potomac River. All rail and highway transportation from Montgomery County southward must go through the District of Columbia.

The chief centers of agricultural marketing and business are Rockville, Gaithersburg, and Damascus. Eventually, most of the products are marketed elsewhere, chiefly in Baltimore and Washington, D.C. Some livestock and other products are marketed in Lancaster, Pa.

Cultural Development and Facilities

The cultural pattern of the county is that of a modern, progressive, rural community that has rapidly become urbanized or at least suburbanized. Industries are limited, but commercial activities that furnish goods and services to the increasing population are expanding.

There are churches of nearly all faiths in the county. The county has many public elementary schools and high schools and many parochial or other private schools. There are no colleges or universities, but the University of Maryland is in nearby Prince Georges County and colleges and universities are located in Washington, D.C., and Baltimore.

Of the farms reporting in the 1954 census, 98 percent had electricity and 87 percent had piped running water. Telephones were in 88 percent of the homes, television sets in 76 percent, and home freezers in 58 percent. The operators of 1,378 farms owned 2,394 automobiles. The 1954 census showed 224 artificial ponds and reservoirs on 201 farms, but in 1959 it was estimated that the number had increased to between 450 and 500.

Farm equipment was reported in 1954 as follows:

	Number
Tractors	1,974
Wheel, other than garden	1,543
Garden tractors	415
Crawler tractors	16
Trucks	1,032
Automobiles	2,394
Milking machines	321
Electric pig brooders	47
Power feed grinders	272
Grain combines	168
Cornpickers	170
Pick-up hay balers	305
Field forage harvesters	122

Agriculture

In spite of the trend toward urbanization, Montgomery County is still one of the most important agricultural areas in Maryland. In 1954 the dollar value of the farm products sold was $9,697,587, which was more than a million dollars more than the average for all the counties in the State. Dairy products accounted for $5,083,234, livestock and livestock products other than dairy products for $2,204,335, and crops for $1,994,773.

Farms of the County

In 1954 there were 1,455 farms in Montgomery County. The overall use of the land in farms was as follows:

	Acres
Land in farms, total	197,335
Cropland harvested	73,874
Cropland used only for pasture	39,640
Cropland not harvested and not pastured	5,250
Woodland pastured	9,823
Woodland not pastured	27,316
Other pasture (not cropland and not woodland)	32,588
Other land (house lots, roads, wasteland)	8,844

There are many types of farms in the county, but nearly half of the farms are classed as miscellaneous. Dairy farms are the second in number, and livestock farms other than dairy and poultry are third. The latter must raise mostly beef cattle, swine, and sheep to be classed as livestock farms. The numbers of the different types of farms in the county in 1954 were as follows:

Type of farm	*Number*
Field crop other than vegetable and fruit and nut	101
Cash grain	96
Other field crop	5
Vegetable	25
Fruit and nut	15
Dairy	306
Poultry	46
Livestock other than dairy and poultry	295
General	55
Primarily crop	5
Primarily livestock	10
Combination crop and livestock	40
Miscellaneous and unclassified	625

The average farm in the county is 135 acres in size, but the trend is toward larger farms. Montgomery County has 110,025 acres in farms of 260 acres or more. The 1954 census showed the number of different sizes of farms and the acreage they cover as follows:

	Number	*Total acreage*
Less than 10 acres	324	1,395
10 to 29 acres	214	3,695
30 to 49 acres	101	3,842
50 to 69 acres	76	4,497
70 to 99 acres	108	9,129
100 to 139 acres	142	16,672
140 to 179 acres	91	14,251
180 to 219 acres	99	19,592
220 to 259 acres	59	14,237
260 to 499 acres	178	59,882
500 to 999 acres	51	33,134
More than 1,000 acres	12	17,009

The 1954 census showed that 74 percent of the farms in the county were operated by their owners, 15 percent by part owners or by managers, and only 11 percent by tenants. The following list classifies the farms by tenure:

	Number of farms	*Total acreage*
Full owners	1,080	114,977
Part owners	193	48,103
Managers	26	10,214
All tenants	156	24,041
Cash tenants	63	11,059
Share-cash tenants	4	1,355
Share tenants	22	5,328
Crop-share tenants	8	2,075
Livestock-share tenants	14	3,253
Croppers	11	1,640
Other and unspecified tenants	56	4,659

Crops and Pasture

Hay occupied the largest acreage of any crop in the county in 1954 and corn the next largest. Wheat, barley, and oats are important small grains. Soybeans are also an important crop. In 1954 most of the acreage in vegetables for sale was in sweet corn. Irish potatoes and sweet potatoes grown for sale and for home use amounted to 5,976 bushels. Tobacco harvested amounted to 37,050 pounds.

There are no data on the proportions of different kinds of grasses or other plants used in pastures, but most pasture stands are basically Kentucky bluegrass, commonly mixed with various clovers. Hay crops include alfalfa, clover, orchardgrass, timothy, bromegrass, tall fescue, and others. They generally are grown as mixtures, but considerable alfalfa and red clover are grown separately.

The acreage of the principal crops in the county in 1954 was as follows:

	Acres
Corn, all purposes	16,895
Harvested for grain	11,920
Cut for silage	4,692
Hogged, grazed, or cut for fodder	283
Small grains threshed or combined:	
Wheat	8,958
Oats	2,311
Barley	3,193
Rye	382
Other grain	48
Soybeans, all purposes	1,003
Hay crops (exclusive of soybean hay):	
Alfalfa and alfalfa mixtures	6,375
Clover, timothy, mixed hay	18,324
Lespedeza	4,469
Small grains cut for hay	1,558
Other hay cut	6,540
Grass silage	2,822
Red clover seed	527
Vegetables for sale:	
Sweet corn	2,087
Other	282

Vegetables grown for sale, other than sweet corn, included snap beans, lima beans, cabbages, melons, cucumbers, peas, sweet peppers, pimentos, and tomatoes.

The area in fruit orchards, groves, and vineyards in 1954 totaled 426 acres. The number of fruit trees and grapevines in the county in 1954 is listed below. This list does not include farms that had less than 20 trees or grapevines.

	Number
Apple trees:	
Of all ages	6,141
Of bearing age	5,330
Peach trees:	
Of all ages	10,295
Of bearing age	8,405
Pear trees:	
Of all ages	454
Of bearing age	336
Cherry trees:	
Of all ages	235
Of bearing age	126
Plum and prune trees:	
Of all ages	171
Of bearing age	86
Grapevines:	
Of all ages	2,239
Of bearing age	1,873

Strawberries were grown on 6 acres in the county in 1954, and 5,846 quarts were harvested for sale.

Livestock

Raising cattle, particularly beef cattle, is an important enterprise in Montgomery County. Raising swine and sheep is not a main enterprise but is important to the economy of the county.

The following list gives the numbers of livestock and poultry on farms in the county in 1954.

	Number
Cattle and calves	43,427
Cows, total	21,631
Milk cows	15,428
Heifers and heifer calves	14,329
Steers and bulls, including calves	7,467
Hogs and pigs	9,977
Sheep and lambs	2,749
Horses and mules	1,488
Chickens over 4 months old	91,012
Turkeys raised	5,892
Ducks raised	2,511

In 1954, 101,828,357 pounds of whole milk was sold for $5,042,120, and 85,861 pounds of butterfat was sold for $41,114. The value of the poultry and poultry products sold in that year was nearly $400,000. The shearing of 2,022 sheep and lambs produced 13,756 pounds of wool.

Glossary

Acidity. See Reaction.

Acre-foot. The quantity of water, soil, or other material that will cover 1 acre to a depth of 1 foot.

Aeration, soil. The exchange of air in the soil with air from the atmosphere.

Aggregate. Many fine soil particles held in a single mass or cluster.

Alluvium. Sand, mud, and other sediments deposited on land by streams.

Bases. The positive, usually metallic elements or combinations of elements that make up the nonacid plant nutrients in soils. The most important of these in plant nutrition are calcium (Ca), potassium (K), magnesium (Mg), and ammonium (NH_4).

Bedrock. The solid rock that underlies the soil and unconsolidated parent material.

Calcareous. Containing calcium carbonate (lime).

California bearing ratio (CBR). The ratio of the ability of a soil to support weight to that of a standard crushed limestone first standardized in California. A soil with a CBR of 16 would support only 16 percent of the load that would be supported by the crushed limestone, per unit area and with the same degree of distortion.

Channery. Refers to soil material of which 15 to 50 percent consists of thin, flat fragments of sandstone, limestone, or schist up to 6 inches along the longer axis.

Chert. A flintlike rock that usually occurs as an impurity in limestone or in other sedimentary rocks.

Clay. Small mineral grains, less than 0.002 millimeter (0.000079 inch) in diameter. As a textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A dense, heavy horizon underlying the upper part of the soil; hard when dry, plastic and sticky when wet.

Cobbly. Refers to soil material of which 15 to 50 percent consists of rounded or partially rounded fragments of rock from 3 to 10 inches in diameter. A single piece is a *cobblestone*, or a *small stone*.

Colluvial fans and cones. Formations at the foot of a slope, made up of colluvium.

Colluvium. Coarse soil material and rock fragments moved by gravity and deposited at the base of slopes. Deposits may be very small and local, as in Montgomery County, or they may be very large and extend for great distances out over valley floors, as in mountainous areas.

Complex, soil. Two or more soils mapped as one unit because they occur together in such an intricate pattern or in such small individual areas that they cannot be shown separately on the soil map.

Consistence, soil. The characteristics of soil material that are expressed by the degree and kind of cohesion and adhesion, or by the resistance of the soil material to deformation or rupture. These characteristics vary with moisture content. When dry, a soil is said to be *loose, soft, slightly hard, hard, very hard,* or *extremely hard.* When moist, a soil is said to be *loose, very friable, friable, firm, very firm,* or *extremely firm.* When wet, a soil is said to be *nonplastic, slightly sticky, sticky,* or *very sticky.*

Contour tillage. Furrows and other farming operations at right angles to the direction of slope and at the same level throughout.

Cover crop. A close-growing crop grown primarily to protect and improve the soil between regular crops, or to provide a ground cover in orchards and vineyards.

Cropland. Land regularly used for crops, except forest crops and permanent pasture. It includes rotation pasture, cultivated summer fallow, orchards, and land ordinarily used for crops but temporarily idle.

Diabase. A basic igneous rock very rich in iron and other metallic elements and low in silica.

Diversion. Any means, usually a terrace, used to divert runoff water from its natural course and thus to protect areas downslope from the diversion from the effects of runoff.

Drainage. The rapidity and extent of the removal of water from the soil by flow over the surface (*runoff*) and by flow through the soil to underground spaces (*internal drainage*).

Erosion, soil. The removal of soil material by geologic agencies, principally wind and running water. *Accelerated erosion* refers to loss of soil material brought about by the activities of man. Soil erosion in Montgomery County is most commonly caused by water and can be classified as *sheet erosion* (the removal of soil material without the development of conspicuous channels), *rill erosion* (which produces small channels), and *gully erosion* (which produces large channels).

Fat clay. Soil material that is more than 60 percent clay.

Fertility. The quality that enables a soil to provide the proper compounds, in the proper amounts and in the proper balance, for the growth of specified plants when other factors such as light, temperature, and physical condition of the soil are favorable.

First bottom. The normal flood plain of a stream; subject to frequent or occasional overflow.

Flood plain. See First bottom.

Forest. Land not in farms that bears a stand of trees of any age or stature, including seedlings, of species that attain a minimum average height of 6 feet at maturity; or land from which such a stand has been removed and which has not been put to other use. Forest on farms is commonly called woodlot, farm woodland, or farm forest.

Fragipan. A very compact soil horizon, rich in silt and usually relatively low in clay; normally has strong, platy structure; interferes with the penetration of roots and water.

Gabbro. A rock of the same composition as diabase, but of different crystalline structure.

Genesis. Mode of origin of the soil; refers particularly to the processes responsible for the development of the solum (A and B horizons) from the unconsolidated parent material.

Gleization or gleying. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the subsoil or substratum, as a result of poor drainage and aeration; expressed in the soil by mottled colors dominated by gray.

Gneiss. A metamorphic rock in which the crystals (mica, feldspar, and quartz) are arranged in bands or layers.

Granodiorite. A rock similar to diabase but of granular or granitic structure.

Gravelly. Refers to soil material of which 15 to 50 percent consists of rounded or angular fragments of rock, not prominently flattened, up to 3 inches in diameter. A single piece is a *pebble. Gravel* is a mass of pebbles.

Great soil group. A broad group of soils having fundamental characteristics in common.

Green-manure crop. Any crop grown and plowed under while green for the purpose of improving the soil, especially by the addition of organic matter.

Horizon, soil. A layer of soil, approximately parallel to the surface, having characteristics produced by soil-forming processes and differing in one or more ways from adjacent horizons in the same soil profile.

A horizon. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and have lost clay minerals, iron, and aluminum with resultant concentration of the more resistant minerals; or (3) horizons belonging to both of the categories.

B horizon. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic material; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizon or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds with the lower limit of the solum.

C horizon. A layer of unconsolidated material, relatively little affected by organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a portion of the solum has developed.

D horizon. Any stratum underlying the C horizon, or the B if no C is present, which is unlike the C, or unlike the material from which the solum has been formed.

Any major horizon (A, B, C, or D) may or may not consist of two or more subdivisions or subhorizons, and each subhorizon in turn may or may not have subdivisions. For the kinds of subdivisions that may exist, along with their designations and definitions, the reader is referred to the Soil Survey Manual (*11*).

Igneous rock. A rock formed by the solidification of molten primary rock material, or magma.

Internal drainage. The movement of water through the soil profile.

Leaching. The removal of materials in solution by the passage of water through the soil.

Lean clay. Soil material that is 40 to 60 percent clay.

Limestone. A sedimentary rock that consists principally of calcium carbonate or, in some cases, of magnesium carbonate.

Liquid limit. The moisture content at which a soil material passes from a plastic to a liquid (free-flowing) state.

Loess. Wind-transported, fine-textured material, uniform and unstratified; mostly silt but may contain some fine sand and clay.

Low-Humic Gley soils. A great soil group in which the soils are characterized by a weak A_1 horizon over a mottled or partially gleyed mineral B horizon that is usually somewhat finer textured than the A horizon.

Mapping unit. A soil, land type, or combination of soils that is given a specific name and a symbol on the soil map.

Maximum density. The greatest amount of soil that can be compacted into any unit of volume; expressed as pounds of dry soil per cubic foot.

Mechanical analysis. The determination of the percentage of soil particles of all sizes—gravels, sands, silts, clays, and all their standard subdivisions; based on the mineral soil only, free of water and organic matter. *Grain size* refers to the size limits of any particular fraction of the soil, and *grain size distribution* refers to the proportions of the various-sized fractions in the whole mineral soil.

Metaandesite. A metamorphosed igneous rock moderately rich in iron and other metallic elements; commonly schistose or slaty.

Metamorphic rocks. Rocks of any origin that have been so altered by heat, pressure, and movement that their physical nature has become completely changed. Such rocks are nearly always crystalline.

Metarhyolite. A rock similar to metaandesite but lower in iron and other metallic elements; chemically similar to granite.

Morphology. The physical constitution of the soil, expressed in the kinds of horizons, their thickness and arrangement in the profile, and the texture, structure, consistence, porosity, and color of each horizon.

Mottles. Patches of contrasting color that vary in number and size; usually associated with poor drainage. Descriptive terms are as follows: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are the following: *fine,* commonly less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* commonly between 5 and 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* commonly more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural drainage. Refers to those conditions that existed during development of the soil as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may result from other causes, such as natural deepening of channels or filling of depressions blocking drainage outlets. The following terms are used to describe natural drainage: *excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.*

Normal soil. A soil having a profile in equilibrium or nearly in equilibrium with its environment; developed under good but not excessive drainage from parent material of mixed mineralogical, physical, and chemical composition, and expressing the full effects of the forces of climate and living matter.

Nutrients. The elements taken in by the plant, essential to its growth, and used by it in the elaboration of its food and tissue. These include nitrogen, phosphorus, calcium, potassium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and others obtained from the soil; and carbon, oxygen, and hydrogen obtained largely from air and water.

Optimum moisture. The moisture content at which the maximum dry density of a soil can be obtained by compaction. For any one soil material there is a specific optimum moisture, below and above which maximum density cannot be obtained. Optimum moisture varies from soil to soil.

Parent material. The unconsolidated mass from which the soil profile or solum (A and B horizons) develops. (See also C horizon; Profile, soil; Solum; Substratum.)

Percent slope. The gradient of a particular slope expressed as the difference in elevation (in feet) between two points 100 feet apart horizontally.

Permeability, soil. That quality of the soil that enables it to transmit water and air.

pH. A numerical designation of relative acidity and alkalinity in soils and other biological systems. (See Reaction.)

Phase, soil. A subdivision of the soil type based chiefly on variations in external characteristics, such as slope, stoniness, or degree of accelerated erosion.

Phyllite. Micaceous schist, intermediate between mica schist and slate.

Plastic limit. The moisture content at which a soil material passes from a solid state to a plastic state.

Plasticity index. The difference, in percent moisture, between the plastic limit and the liquid limit; therefore, the range in moisture content over which a soil material remains plastic.

Poorly graded. Of a soil, consisting of particles chiefly of the same or very nearly the same size or diameter; having a narrow range of particle size. Such a soil can be increased in density only slightly by compaction.

Productivity, soil. The capability of a soil to produce a specified plant or sequence of plants under a given system of management.

Profile, soil. A vertical section of the soil through all horizons and extending into the parent material. (See also Parent material; Horizon, soil.)

Quartz. A rock that consists chiefly or entirely of silicon dioxide.

Quartzite. Quartz or sandstone that has been altered by heat and pressure until it is fused.

Reaction. The degree of acidity of the soil expressed in pH values or in words as follows:

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red-Yellow Podzolic soils. A great soil group in which the soils are characterized by a thin, organic-mineral A horizon, a light-colored, bleached, leached A_2 horizon, and a finer textured, red to yellow B horizon; acid—base saturation in the B horizon is normally less than 35 percent and decreases with depth.

Regosols. A great soil group in which the soils consist of unconsolidated and unweathered rock or mineral material that shows little or no evidence of genetic soil development. A common example is dune sand.

Relief. The elevations and inequalities of the land surface considered collectively.

Residuum. Unconsolidated, partly weathered material presumed to have been derived from the underlying rock.

Runoff. Removal of water by flow over the surface; surface drainage. Described in terms of rate of flow, as very rapid, rapid, medium, slow, very slow, and ponded.

Sand. Rock or mineral fragments between 0.05 millimeter (0.002 inch) and 2.0 millimeters (0.079 inch) in diameter. As a textural class, soil that is 90 percent or more sand.

Sandstone. A rock made up chiefly of grains of silica sand cemented together.

Schist. A metamorphic rock that is crystalline and has a foliated structure; splits or cleaves readily. The following kinds of schist are common in Montgomery County:

Granitized schist. Schist, usually mica schist, that has a somewhat granular or granite-like structure.

Mica schist. Schist that contains a dominant proportion of mica, usually muscovite mica in very fine flakes.

Quartz schist or quartzose schist. Schist that contains a dominant proportion of fine quartzite.

Sericite. Schist that has a very soft or "silky" feel.

Talcose schist. Schist that contains a large proportion of mineral talc or some mineral resembling talc in physical properties.

Sediment. Rock, mineral, or soil particles of any size, transported and deposited by water, ice, wind, or gravity.

Sedimentary rock. Rock formed by the consolidation of any of many kinds of sediment. Sandstone, shale, and limestone are common sedimentary rocks.

Series, soil. A group of soils having the same profile characteristics and the same general range in color, structure, consistence, and sequence of horizons; the same general conditions of relief and drainage; and usually a common or similar origin and mode of formation.

Serpentine. A rock or mineral, essentially magnesium silicate; commonly green and in many places mottled.

Shale. A rock formed by the hardening of clay deposits.

Shaly. Refers to soil material of which 15 to 50 percent consists of flattened fragments of shale less than 6 inches along the longer axis. A single piece is a *shale fragment.* Larger fragments are *flags* or *flagstones.*

Silt. Small mineral soil grains ranging from 0.002 millimeter (0.000079 inch) to 0.05 millimeter (0.002 inch) in diameter.

Slate. A dense, fine-grained rock produced by the alteration of clay or shale by heat and pressure; has a characteristic cleavage.

Slaty. Refers to soil material of which 15 to 50 percent consists of fragments of slate less than 6 inches along the longer axis. A single piece is a *slate fragment.*

Soil. The natural medium for the growth of land plants on the surface of the earth; composed of mineral and organic materials.

Sols Bruns Acides. A great soil group in which the soils are characterized by a weak A_1 horizon, a very weak A_2 horizon or none, and a B horizon that is differentiated almost entirely by color; no significant increase in clay minerals in the B horizon as compared to the A horizon; little structural development; low degree of base saturation and very strong acidity.

Solum. The genetic soil developed by soil-forming processes; the A and B horizons; does not include the parent material (C horizon).

Stony. Containing enough stones more than 10 inches in diameter to interfere with but not prevent cultivation of intertilled crops. A *very stony* soil contains enough stones to make tillage impractical and to bar the use of farm machinery.

Structure, soil. The arrangement of the individual soil particles into aggregates that have definite shape and pattern. Common kinds of structure in Montgomery County are single grain, crumb, granular, blocky, subangular blocky, platy, and massive.

Subgrade. The substratum, either in-place or fill material, prepared for highway construction; does not include stabilized base course or actual paving materials.

Subgrade modulus. The resistance of the soil per unit area displacement under load expressed in pounds per square inch. Hence, if a load of 1,000 pounds on 100 square inches of surface penetrates 1 inch, the modulus is 10.

Subsoil. Technically, the B horizon of a soil; in more general terms, that part of the soil profile below plow depth.

Substratum. Any layer beneath the B horizon; may be a conforming (C) horizon or an unconforming (D) horizon.

Surface soil. That part of the upper profile usually disturbed by plowing; more technically, the A horizon.

Terrace (geological). An old alluvial plain, commonly flat or smooth but in some cases sloping and dissected, bordering a stream, a lake, or the sea; frequently called a second bottom, as contrasted to the present flood plain; seldom subject to overflow.

Texture, soil. The relative proportions of sand, silt, and clay particles in the soil. A coarse-textured soil is one high in sand; a fine-textured one contains a large proportion of clay. (See Sand; Silt; Clay.)

Topography. The configuration of the surface of the land.

Type, soil. A subdivision of the soil series based on the texture of the surface soil; for example, in the Sassafras series in Montgomery County there are two types, Sassafras loam and Sassafras sandy loam.

Undifferentiated mapping unit. A mapping unit that consists of two or more soils or land types that are not geographically associated.

Unified soil classification system. The system of mechanical soil classification of the Corps of Engineers, Department of the Army.

Upland (geological). Land consisting of materials unworked by water in recent geological time and ordinarily lying at higher elevations than the alluvial plains and the terraces.

Water table. The upper limit of the soil seasonally saturated with water; does not refer to the temporary saturation level during and immediately after rains.

Well graded. Of a soil, consisting of particles well distributed over a rather wide range in size or diameter. Such a soil usually can be easily increased in density and bearing properties by compaction.

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GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND SEWAGE DISPOSAL GROUPS

[See table 2, p. 5, for approximate acreage and proportionate extent of soils; table 3, p. 50, for estimated average acre yields; table 4, p. 60, for suitability of some soils for reforestation; table 5, p. 62, and table 6, p. 80, for information on engineering properties of soils; and table 7, p. 86, for suitability of some soils for irrigation]

Map symbol	*Mapping unit*	*Page*	*Capability unit*	*Page*	*Sewage disposal group*	*Page*
AdA	Aldino silt loam, 0 to 3 percent slopes	7	IIw–11	42	7	91
AdB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded	8	IIIe–13	43	7	91
AdC2	Aldino silt loam, 8 to 15 percent slopes, moderately eroded	8	IIIe–13	43	7	91
AdC3	Aldino silt loam, 8 to 15 percent slopes, severely eroded	8	IVe–41	46	7	91
AsA	Ashton silt loam, 0 to 3 percent slopes	8	I–6	38	8	92
AsB2	Ashton silt loam, 3 to 8 percent slopes, moderately eroded	8	IIe–6	39	8	92
BaA2	Beltsville silt loam, 0 to 3 percent slopes, moderately eroded	9	IIw 8	42	7	91
BaB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	9	IIw–8	42	7	91
BaC2	Beltsville silt loam, 8 to 15 percent slopes, moderately eroded	9	IIIe–13	43	7	91
BeA	Bermudian silt loam, 0 to 3 percent slopes	10	I–6	38	8	92
BeB	Bermudian silt loam, 3 to 8 percent slopes	10	IIe–6	39	8	92
BoA	Bowmansville silt loam, 0 to 3 percent slopes	10	VIw–1	47	8	92
BrC2	Brandywine loam, 3 to 15 percent slopes, moderately eroded	10	IIIs–7	44	5	91
BrC3	Brandywine loam, 3 to 15 percent slopes, severely eroded	10	IVe–10	45	5	91
BrD2	Brandywine loam, 15 to 25 percent slopes, moderately eroded	10	IVe–10	45	6	91
BrD3	Brandywine loam, 15 to 25 percent slopes, severely eroded	11	VIIe–3	48	6	91
BuA	Bucks silt loam, 0 to 3 percent slopes	11	I–4	38	4	90
BuA2	Bucks silt loam, 0 to 3 percent slopes, moderately eroded	11	IIe–4	39	4	90
BuB2	Bucks silt loam, 3 to 8 percent slopes, moderately eroded	11	IIe–4	39	4	90
BuB3	Bucks silt loam, 3 to 8 percent slopes, severely eroded	11	IIIe–4	42	4	90
BuC3	Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded	11	IIIe–4	42	5	91
CaB	Calvert silt loam, 0 to 8 percent slopes	12	Vw–2	46	7	91
CbA	Captina silt loam, 0 to 3 percent slopes	12	IIw–2	41	7	91
CbB2	Captina silt loam, 3 to 8 percent slopes, moderately eroded	12	IIe–14	40	7	91
ChA	Chester silt loam, 0 to 3 percent slopes	13	I–4	38	1	89
ChA2	Chester silt loam, 0 to 3 percent slopes, moderately eroded	13	IIe–4	39	1	89
ChB2	Chester silt loam, 3 to 8 percent slopes, moderately eroded	13	IIe–4	39	1	89
ChB3	Chester silt loam, 3 to 8 percent slopes, severely eroded	13	IIIe–4	42	1	89
ChC2	Chester silt loam, 8 to 15 percent slopes, moderately eroded	13	IIIe–4	42	2	90
ChC3	Chester silt loam, 8 to 15 percent slopes, severely eroded	13	IVe–3	45	2	90
CkA	Chewacla silt loam, 0 to 3 percent slopes	13	IIw–7	41	8	92
ClB2	Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded	14	IIe–7	40	4	90
ClB3	Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded	14	IIIe–7	43	4	90
ClC2	Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded	14	IIIe–7	43	5	91
ClC3	Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded	14	IVe–7	45	5	91
ClD2	Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded	14	IVe–7	45	6	91
ClE2	Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded	14	VIe–2	47	6	91
CmB2	Chillum silt loam, 3 to 8 percent slopes, moderately eroded	14	IIe–7	40	4	90
CmC2	Chillum silt loam, 8 to 15 percent slopes, moderately eroded	15	IIIe–7	43	5	91
CmD2	Chillum silt loam, 15 to 25 percent slopes, moderately eroded	15	IVe–7	45	6	91
CnB2	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded	15	IIe–7	40	4	90
CnB3	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded	15	IIIe–7	43	4	90
CnC2	Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded	15	IIIe–7	43	5	91
CnD3	Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded	15	VIe–2	47	6	91
CoC2	Chrome silt loam, 8 to 15 percent slopes, moderately eroded	15	IIIe–13	43	7	91
CpD2	Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded	15	VIIs–2	48	7	91
CrB2	Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded	15	IIIe–13	43	7	91
CrB3	Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded	16	IIIe–13	43	7	91
Cs	Colluvial land	16	IIw–8	42	7	91
CtA	Congaree silt loam, 0 to 3 percent slopes	16	I–6	38	8	92
CvA2	Conowingo silt loam, 0 to 3 percent slopes, moderately eroded	17	IIw–11	42	7	91
CvA3	Conowingo silt loam, 0 to 3 percent slopes, severely eroded	17	IIIe–13	43	7	91
CwB2	Croom gravelly loam, 3 to 8 percent slopes, moderately eroded	17	IIe 7	40	4	90
CwC2	Croom gravelly loam, 8 to 15 percent slopes, moderately eroded	17	IIIe–7	43	5	91
CwC3	Croom gravelly loam, 8 to 15 percent slopes, severely eroded	17	IVe–7	45	5	91
CwD2	Croom gravelly loam, 15 to 25 percent slopes, moderately eroded	17	IVe–7	45	6	91
CwD3	Croom gravelly loam, 15 to 25 percent slopes, severely eroded	17	VIe–2	47	6	91
CwE2	Croom gravelly loam, 25 to 45 percent slopes, moderately eroded	17	VIe–2	47	6	91
CwE3	Croom gravelly loam, 25 to 45 percent slopes, severely eroded	17	VIIe–3	48	6	91
CxA	Croton silt loam, 0 to 8 percent slopes	18	Vw–2	46	7	91
EdB2	Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded	18	IIe–25	41	1	89
EdC3	Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded	18	IVe–25	46	2	90
EeA	Elioak silt loam, 0 to 3 percent slopes	19	I–4	38	1	89
EeB2	Elioak silt loam, 3 to 8 percent slopes, moderately eroded	19	IIe–4	39	1	89
EeC2	Elioak silt loam, 8 to 15 percent slopes, moderately eroded	19	IIIe–4	42	2	90
EkB3	Elioak silty clay loam, 3 to 8 percent slopes, severely eroded	19	IIIe–4	42	1	89
EkC3	Elioak silty clay loam, 8 to 15 percent slopes, severely eroded	19	IVe–3	45	2	90
ElA2	Elk silt loam, 0 to 3 percent slopes, moderately eroded	20	IIe–1	39	1	89
ElB2	Elk silt loam, 3 to 8 percent slopes, moderately eroded	20	IIe–1	39	1	89
EmC3	Elk silty clay loam, 8 to 15 percent slopes, severely eroded	20	IVe–3	45	2	90
Ep	Eroded land, Penn materials	20	IVe–10	45	5	91
GcB2	Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded	20	IIe–10	40	4	90

GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND SEWAGE DISPOSAL GROUPS—Continued

Map symbol	Mapping unit	Page	Capability unit	Page	Sewage disposal group	Page
GcB3	Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded	20	IIIe–10	43	4	90
GcC2	Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded	20	IIIe–10	43	5	91
GcC3	Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded	20	IVe–10	45	5	91
GcD2	Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded	20	IVe–10	45	6	91
GcD3	Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded	20	VIe–3	47	6	91
GgB2	Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded	20	IIe–25	41	1	89
GgB3	Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded	20	IIIe–25	44	1	89
GgC2	Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded	21	IIIe–25	44	2	90
GgC3	Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded	21	IVe–25	46	2	90
GgD2	Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded	21	IVe–25	46	3	90
GhA	Glenelg silt loam, 0 to 3 percent slopes	21	IIe–25	41	1	89
GhB2	Glenelg silt loam, 3 to 8 percent slopes, moderately eroded	21	IIe–25	41	1	89
GhB3	Glenelg silt loam, 3 to 8 percent slopes, severely eroded	21	IIIe–25	44	1	89
GhC2	Glenelg silt loam, 8 to 15 percent slopes, moderately eroded	21	IIIe–25	44	2	90
GhC3	Glenelg silt loam, 8 to 15 percent slopes, severely eroded	21	IVe–25	46	2	90
GhD2	Glenelg silt loam, 15 to 25 percent slopes, moderately eroded	21	IVe–25	46	3	90
GhD3	Glenelg silt loam, 15 to 25 percent slopes, severely eroded	21	VIe–3	47	3	90
GlE2	Glenelg soils, 25 to 45 percent slopes, moderately eroded	21	VIe–3	47	3	90
GlE3	Glenelg soils, 25 to 45 percent slopes, severely eroded	21	VIIe–3	48	3	90
GmA	Glenville silt loam, 0 to 3 percent slopes	22	IIw–1	41	7	91
GmB	Glenville silt loam, 3 to 8 percent slopes	22	IIw–1	41	7	91
GmB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	22	IIIe–13	43	7	91
Gp	Gravel pit	22	VIIIs–3	49	------	------
Gr	Gullied land, Penn materials	22	VIIe–3	48	6	91
HaA	Huntington silt loam, 0 to 3 percent slopes	22	I–6	38	8	92
HaB2	Huntington silt loam, 3 to 8 percent slopes, moderately eroded	22	IIe–6	39	8	92
IdA	Iredell silt loam, 0 to 3 percent slopes	23	IVw–3	46	7	91
IdB2	Iredell silt loam, 3 to 8 percent slopes, moderately eroded	23	IVw–3	46	7	91
IeC3	Iredell silty clay loam, 3 to 15 percent slopes, severely eroded	23	IVe–41	46	7	91
LaC2	Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded	23	IIIs–1	44	1	89
LaD3	Lakeland loamy sand, 15 to 25 percent slopes, severely eroded	23	VIIs–1	48	3	90
LeB2	Legore silt loam, 3 to 8 percent slopes, moderately eroded	24	IIe–10	40	4	90
LeB3	Legore silt loam, 3 to 8 percent slopes, severely eroded	24	IIIe–10	43	4	90
LeC2	Legore silt loam, 8 to 15 percent slopes, moderately eroded	24	IIIe–10	43	5	91
LeC3	Legore silt loam, 8 to 15 percent slopes, severely eroded	24	IVe–10	45	5	91
LeD3	Legore silt loam, 15 to 25 percent slopes, severely eroded	24	VIe–3	47	6	91
LgA2	Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded	25	IVw–3	46	7	91
LgB2	Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded	25	IVw–3	46	7	91
LhA2	Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded	25	IIe–10	40	4	90
LhB2	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded	25	IIe–10	40	4	90
LhB3	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded	25	IIIe–10	43	4	90
LhC2	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded	25	IIIe–10	43	5	91
LhC3	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded	25	IVe–10	45	5	91
LhD2	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded	25	IVe–10	45	6	91
LhD3	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded	25	VIe–3	47	6	91
LhE3	Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded.	25	VIIe–3	48	6	91
LnA	Lindside silt loam, 0 to 3 percent slopes	26	IIw–7	41	8	92
LoB2	Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded	26	IIIs–7	44	4	90
LoC2	Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded	26	IIIs–7	44	5	91
LoD2	Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded	26	IVe–10	45	6	91
LrB3	Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded	26	IVe–10	45	4	90
LrC3	Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded	26	IVe–10	45	5	91
LrD3	Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded	26	VIIe–3	48	6	91
LrE3	Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded.	27	VIIe–3	48	6	91
Ma	Made land	27				
McB2	Manor channery silt loam, 3 to 8 percent slopes, moderately eroded	27	IIe–10	40	4	90
McB3	Manor channery silt loam, 3 to 8 percent slopes, severely eroded	27	IIIe–10	43	4	90
McC2	Manor channery silt loam, 8 to 15 percent slopes, moderately eroded	27	IIIe–10	43	5	91
McC3	Manor channery silt loam, 8 to 15 percent slopes, severely eroded	27	IVe–10	45	5	91
McD2	Manor channery silt loam, 15 to 25 percent slopes, moderately eroded	27	IVe–10	45	6	91
McD3	Manor channery silt loam, 15 to 25 percent slopes, severely eroded	27	VIe–3	47	6	91
McE2	Manor channery silt loam, 25 to 45 percent slopes, moderately eroded	27	VIe–3	47	6	91
McE3	Manor channery silt loam, 25 to 45 percent slopes, severely eroded	27	VIIe–3	48	6	91
MdB2	Manor silt loam, 3 to 8 percent slopes, moderately eroded	27	IIe–25	41	1	89
MdB3	Manor silt loam, 3 to 8 percent slopes, severely eroded	28	IIIe–25	44	1	89
MdC2	Manor silt loam, 8 to 15 percent slopes, moderately eroded	28	IIIe–25	44	2	90
MdC3	Manor silt loam, 8 to 15 percent slopes, severely eroded	28	IVe–25	46	2	90
MdD2	Manor silt loam, 15 to 25 percent slopes, moderately eroded	28	IVe–25	46	3	90
MdD3	Manor silt loam, 15 to 25 percent slopes, severely eroded	28	VIe–3	47	3	90
MdE2	Manor silt loam, 25 to 45 percent slopes, moderately eroded	28	VIe–3	47	3	90
MeC4	Manor soils, 8 to 15 percent slopes, very severely eroded	28	VIe–3	47	2	90
MeD4	Manor soils, 15 to 25 percent slopes, very severely eroded	28	VIIe–3	48	3	90
MeE3	Manor soils, 25 to 45 percent slopes, severely eroded	28	VIIe–3	48	3	90

GUIDE TO MAPPING UNITS, CAPABILITY UNITS, AND SEWAGE DISPOSAL GROUPS—Continued

Map symbol	*Mapping unit*	*Page*	*Capability unit*	*Page*	*Sewage disposal group*	*Page*
MeF	Manor soils, 45 to 65 percent slopes	28	VIIe–3	48	3	90
MgA	Melvin silt loam, 0 to 3 percent slopes	28	IIIw–1	44	8	92
Mh	Mixed alluvial land	28	VIw–1	47	8	92
MmB2	Montalto silt loam, 3 to 8 percent slopes, moderately eroded	29	IIe–4	39	1	89
MmC2	Montalto silt loam, 8 to 15 percent slopes, moderately eroded	29	IIIe–4	42	2	90
MnD2	Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded	29	VIe–3	47	3	90
MoC2	Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded	29	VIs–2	48	4	90
MoE2	Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded	29	VIIs–2	48	6	91
NeB2	Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded	29	IIe–4	39	1	89
NeC2	Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded	30	IIIe–4	42	2	90
NsB3	Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded	30	IIIe–4	42	1	89
NsC3	Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded	30	IVe–3	45	2	90
NsD3	Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded	30	VIe–3	47	3	90
PeA2	Penn silt loam, 0 to 3 percent slopes, moderately eroded	30	IIe–10	40	4	90
PeB2	Penn silt loam, 3 to 8 percent slopes, moderately eroded	30	IIe–10	40	4	90
PeB3	Penn silt loam, 3 to 8 percent slopes, severely eroded	30	IIIe–10	43	4	90
PeC2	Penn silt loam, 8 to 15 percent slopes, moderately eroded	30	IIIe–10	43	5	91
PeC3	Penn silt loam, 8 to 15 percent slopes, severely eroded	30	IVe–10	45	5	91
PeC4	Penn silt loam, 8 to 15 percent slopes, very severely eroded	30	VIe–3	47	5	91
PeD2	Penn silt loam, 15 to 25 percent slopes, moderately eroded	30	IVe–10	45	6	91
PeD3	Penn silt loam, 15 to 25 percent slopes, severely eroded	30	VIe–3	47	6	91
PeE2	Penn silt loam, 25 to 45 percent slopes, moderately eroded	30	VIe–3	47	6	91
PsF	Penn soils, 45 to 65 percent slopes	30	VIIe–3	48	6	91
PvC2	Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded	31	VIs–2	48	4	90
PvE2	Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded	31	VIIs–2	48	6	91
ReA	Readington silt loam, 0 to 3 percent slopes	31	IIw–11	42	7	91
ReA2	Readington silt loam, 0 to 3 percent slopes, moderately eroded	31	IIw–11	42	7	91
ReB2	Readington silt loam, 3 to 8 percent slopes, moderately eroded	31	IIIe–13	43	7	91
RkA	Roanoke silt loam, 0 to 8 percent slopes	32	Vw–2	46	7	91
Rn	Rock land	32	VIIIs–2	48	5	91
RoA	Rowland silt loam, 0 to 8 percent slopes	32	IIw–7	41	8	92
RsB2	Rumford loamy sand, 3 to 8 percent slopes, moderately eroded	32	IIIs–1	44	1	89
SaB2	Sassafras loam, 3 to 8 percent slopes, moderately eroded	33	IIe–4	39	1	89
SaC2	Sassafras loam, 8 to 15 percent slopes, moderately eroded	33	IIIe–4	42	2	90
SfB2	Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded	33	IIe–4	39	1	89
SsB2	Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded	33	IIe–5	39	1	89
SsC2	Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded	33	IIIe–5	43	2	90
SsE2	Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded	33	IVe–3	45	3	90
StC	Stony land, Manor materials, 3 to 15 percent slopes	33	VIs–2	48	4	90
StE	Stony land, Manor materials, 15 to 45 percent slopes	33	VIIs–2	48	6	91
UbA	Urbana silt loam, 0 to 3 percent slopes	34	IIw–11	42	7	91
UbB2	Urbana silt loam, 3 to 8 percent slopes, moderately eroded	34	IIIe–13	43	7	91
UbC2	Urbana silt loam, 8 to 15 percent slopes, moderately eroded	34	IIIe–13	43	7	91
UbC3	Urbana silt loam, 8 to 15 percent slopes, severely eroded	34	IVe–41	46	7	91
WcB	Watchung silt loam, 0 to 8 percent slopes	34	Vw–2	46	7	91
WhA	Wehadkee silt loam, 0 to 3 percent slopes	35	VIw–1	47	8	92
WkA	Wickham silt loam, 0 to 3 percent slopes	35	I–4	38	1	89
WkB2	Wickham silt loam, 3 to 8 percent slopes, moderately eroded	35	IIe–4	39	1	89
WkC2	Wickham silt loam, 8 to 15 percent slopes, moderately eroded	35	IIIe–4	42	2	90
WoA	Worsham silt loam, 0 to 8 percent slopes	36	Vw–2	46	7	91

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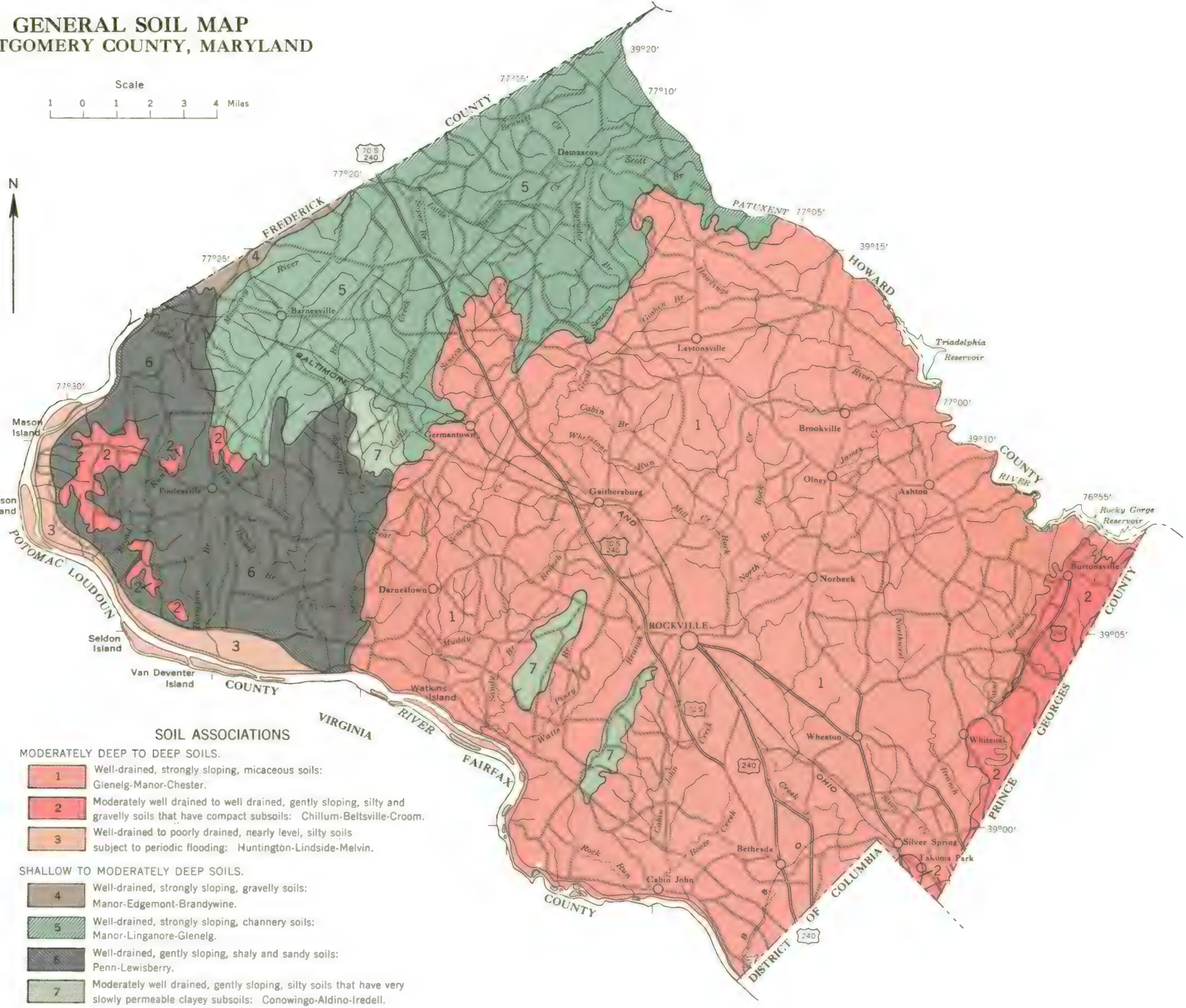
GENERAL SOIL MAP
MONTGOMERY COUNTY, MARYLAND

Scale
1 0 1 2 3 4 Miles

N



SOIL ASSOCIATIONS

MODERATELY DEEP TO DEEP SOILS.

1 — Well-drained, strongly sloping, micaceous soils: Glenelg-Manor-Chester.

2 — Moderately well drained to well drained, gently sloping, silty and gravelly soils that have compact subsoils: Chillum-Beltsville-Croom.

3 — Well-drained to poorly drained, nearly level, silty soils subject to periodic flooding: Huntington-Lindside-Melvin.

SHALLOW TO MODERATELY DEEP SOILS.

4 — Well-drained, strongly sloping, gravelly soils: Manor-Edgemont-Brandywine.

5 — Well-drained, strongly sloping, channery soils: Manor-Linganore-Glenelg.

6 — Well-drained, gently sloping, shaly and sandy soils: Penn-Lewisberry.

7 — Moderately well drained, gently sloping, silty soils that have very slowly permeable clayey subsoils: Conowingo-Aldino-Iredell.

INDEX TO MAP SHEETS
MONTGOMERY COUNTY, MARYLAND

Scale
1 0 1 2 3 4 Miles

N

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54

39°20′ 39°15′ 39°10′ 39°05′ 39°00′
77°30′ 77°25′ 77°20′ 77°15′ 77°10′ 77°05′ 77°00′ 76°55′

COUNTY
FREDERICK
PATUXENT
HOWARD
BALTIMORE
MONTGOMERY
POTOMAC
LOUDOUN
VIRGINIA
RIVER
FAIRFAX
COUNTY
DISTRICT OF COLUMBIA
PRINCE GEORGES
COUNTY

Damascus
Barnesville
Laytonsville
Triadelphia Reservoir
Germantown
Brookville
Poolesville
Gaithersburg
Olney
Ashton
Rocky Gorge Reservoir
Darnestown
Norbeck
Burtonsville
ROCKVILLE
Wheaton
Whiteoak
Silver Spring
Takoma Park
Bethesda
Cabin John
Mason Island
Harrison Island
Seldon Island
Van Deventer Island
Watkins Island

70 S
240
29

Bennett Cr
Scott Br
Little Seneca Cr
Monocacy River
Little Monocacy R
Seneca Creek
Tenmile Cr
Great Seneca Cr
Hawlings R
Goshen Br
Triadelphia Reservoir
Cabin Br
Whetstone Run
Little Bennett Cr
Magruder Br
Great Seneca Cr
Rock Cr
James Cr
Mill Cr
North Br
Northwest Br
Paint Br
Rocky Gorge Reservoir
Broad Run
Horsepen Br
Russell Br
Muddy Br
Sandy Br
Piney Br
Watts Br
Cabin John Cr
Rock Run
Booze Creek
Sligo Cr
Takoma Park

Inset, sheet 18
Inset, sheet 19
Inset, sheet 41

SOIL LEGEND

The first letter in each soil symbol is the initial of the soil series name. If slope forms part of the soil name, a second capital letter shows the range of steepness. A number shows that the soil is named as eroded.

SYMBOL	NAME
AdA	Aldino silt loam, 0 to 3 percent slopes
AdB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded
AdC2	Aldino silt loam, 8 to 15 percent slopes, moderately eroded
AdC3	Aldino silt loam, 8 to 15 percent slopes, severely eroded
AsA	Ashton silt loam, 0 to 3 percent slopes
AsB2	Ashton silt loam, 3 to 8 percent slopes, moderately eroded
BaA2	Beltsville silt loam, 0 to 3 percent slopes, moderately eroded
BaB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded
BaC2	Beltsville silt loam, 8 to 15 percent slopes, moderately eroded
BeA	Bermudian silt loam, 0 to 3 percent slopes
BeB	Bermudian silt loam, 3 to 8 percent slopes
BoA	Bowmansville silt loam, 0 to 3 percent slopes
BrC2	Brandywine loam, 3 to 15 percent slopes, moderately eroded
BrC3	Brandywine loam, 3 to 15 percent slopes, severely eroded
BrD2	Brandywine loam, 15 to 25 percent slopes, moderately eroded
BrD3	Brandywine loam, 15 to 25 percent slopes, severely eroded
BuA	Bucks silt loam, 0 to 3 percent slopes
BuA2	Bucks silt loam, 0 to 3 percent slopes, moderately eroded
BuB2	Bucks silt loam, 3 to 8 percent slopes, moderately eroded
BuB3	Bucks silt loam, 3 to 8 percent slopes, severely eroded
BuC3	Bucks silt loam, 8 to 15 percent slopes, moderately and severely eroded
CaB	Calvert silt loam, 0 to 8 percent slopes
CbA	Captina silt loam, 0 to 3 percent slopes
CbB2	Captina silt loam, 3 to 8 percent slopes, moderately eroded
ChA	Chester silt loam, 0 to 3 percent slopes
ChA2	Chester silt loam, 0 to 3 percent slopes, moderately eroded
ChB2	Chester silt loam, 3 to 8 percent slopes, moderately eroded
ChB3	Chester silt loam, 3 to 8 percent slopes, severely eroded
ChC2	Chester silt loam, 8 to 15 percent slopes, moderately eroded
ChC3	Chester silt loam, 8 to 15 percent slopes, severely eroded
CkA	Chewacla silt loam, 0 to 3 percent slopes
ClB2	Chillum gravelly silt loam, 3 to 8 percent slopes, moderately eroded
ClB3	Chillum gravelly silt loam, 3 to 8 percent slopes, severely eroded
ClC2	Chillum gravelly silt loam, 8 to 15 percent slopes, moderately eroded
ClC3	Chillum gravelly silt loam, 8 to 15 percent slopes, severely eroded
ClD2	Chillum gravelly silt loam, 15 to 25 percent slopes, moderately eroded
ClE2	Chillum gravelly silt loam, 25 to 45 percent slopes, moderately eroded
CmB2	Chillum silt loam, 3 to 8 percent slopes, moderately eroded
CmC2	Chillum silt loam, 8 to 15 percent slopes, moderately eroded
CmD2	Chillum silt loam, 15 to 25 percent slopes, moderately eroded
CnB2	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, moderately eroded
CnB3	Chillum and Penn gravelly silt loams, 3 to 8 percent slopes, severely eroded
CnC2	Chillum and Penn gravelly silt loams, 8 to 15 percent slopes, moderately eroded
CnD3	Chillum and Penn gravelly silt loams, 8 to 25 percent slopes, severely eroded
CoC2	Chrome silt loam, 8 to 15 percent slopes, moderately eroded
CpD2	Chrome very stony silt loam, 3 to 25 percent slopes, moderately eroded
CrB2	Chrome and Conowingo silt loams, 3 to 8 percent slopes, moderately eroded
CrB3	Chrome and Conowingo silt loams, 3 to 8 percent slopes, severely eroded
Cs	Colluvial land
CtA	Congaree silt loam, 0 to 3 percent slopes
CvA2	Conowingo silt loam, 0 to 3 percent slopes, moderately eroded
CvA3	Conowingo silt loam, 0 to 3 percent slopes, severely eroded
CwB2	Croom gravelly loam, 3 to 8 percent slopes, moderately eroded
CwC2	Croom gravelly loam, 8 to 15 percent slopes, moderately eroded
CwC3	Croom gravelly loam, 8 to 15 percent slopes, severely eroded
CwD2	Croom gravelly loam, 15 to 25 percent slopes, moderately eroded
CwD3	Croom gravelly loam, 15 to 25 percent slopes, severely eroded
CwE2	Croom gravelly loam, 25 to 45 percent slopes, moderately eroded
CwE3	Croom gravelly loam, 25 to 45 percent slopes, severely eroded
CxA	Croton silt loam, 0 to 8 percent slopes
EdB2	Edgemont gravelly sandy loam, 3 to 8 percent slopes, moderately eroded
EdC3	Edgemont gravelly sandy loam, 8 to 15 percent slopes, severely eroded
EeA	Elioak silt loam, 0 to 3 percent slopes
EeB2	Elioak silt loam, 3 to 8 percent slopes, moderately eroded
EeC2	Elioak silt loam, 8 to 15 percent slopes, moderately eroded
EkB3	Elioak silty clay loam, 3 to 8 percent slopes, severely eroded
EkC3	Elioak silty clay loam, 8 to 15 percent slopes, severely eroded
ElA2	Elk silt loam, 0 to 3 percent slopes, moderately eroded
ElB2	Elk silt loam, 3 to 8 percent slopes, moderately eroded
EmC3	Elk silty clay loam, 8 to 15 percent slopes, severely eroded
Ep	Eroded land, Penn materials
GcB2	Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded
GcB3	Glenelg channery silt loam, 3 to 8 percent slopes, severely eroded
GcC2	Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded
GcC3	Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded
GcD2	Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded
GcD3	Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded
GgB2	Glenelg gravelly loam, 3 to 8 percent slopes, moderately eroded
GgB3	Glenelg gravelly loam, 3 to 8 percent slopes, severely eroded
GgC2	Glenelg gravelly loam, 8 to 15 percent slopes, moderately eroded
GgC3	Glenelg gravelly loam, 8 to 15 percent slopes, severely eroded
GgD2	Glenelg gravelly loam, 15 to 25 percent slopes, moderately eroded
GhA	Glenelg silt loam, 0 to 3 percent slopes
GhB2	Glenelg silt loam, 3 to 8 percent slopes, moderately eroded
GhB3	Glenelg silt loam, 3 to 8 percent slopes, severely eroded
GhC2	Glenelg silt loam, 8 to 15 percent slopes, moderately eroded
GhC3	Glenelg silt loam, 8 to 15 percent slopes, severely eroded
GhD2	Glenelg silt loam, 15 to 25 percent slopes, moderately eroded
GhD3	Glenelg silt loam, 15 to 25 percent slopes, severely eroded
GlE2	Glenelg soils, 25 to 45 percent slopes, moderately eroded
GlE3	Glenelg soils, 25 to 45 percent slopes, severely eroded
GmA	Glenville silt loam, 0 to 3 percent slopes
GmB	Glenville silt loam, 3 to 8 percent slopes
GmB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded
Gp	Gravel pit
Gr	Gullied land, Penn materials
HaA	Huntington silt loam, 0 to 3 percent slopes
HaB2	Huntington silt loam, 3 to 8 percent slopes, moderately eroded
IdA	Iredell silt loam, 0 to 3 percent slopes
IdB2	Iredell silt loam, 3 to 8 percent slopes, moderately eroded
IeC3	Iredell silty clay loam, 3 to 15 percent slopes, severely eroded
LaC2	Lakeland loamy sand, 3 to 15 percent slopes, moderately eroded
LaD3	Lakeland loamy sand, 15 to 25 percent slopes, severely eroded
LeB2	Legore silt loam, 3 to 8 percent slopes, moderately eroded
LeB3	Legore silt loam, 3 to 8 percent slopes, severely eroded
LeC2	Legore silt loam, 8 to 15 percent slopes, moderately eroded
LeC3	Legore silt loam, 8 to 15 percent slopes, severely eroded
LeD3	Legore silt loam, 15 to 25 percent slopes, severely eroded
LgA2	Leonardtown silt loam, 0 to 3 percent slopes, moderately eroded
LgB2	Leonardtown silt loam, 3 to 8 percent slopes, moderately eroded
LhA2	Lewisberry sandy loam, shallow, 0 to 3 percent slopes, moderately eroded
LhB2	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, moderately eroded
LhB3	Lewisberry sandy loam, shallow, 3 to 8 percent slopes, severely eroded
LhC2	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, moderately eroded
LhC3	Lewisberry sandy loam, shallow, 8 to 15 percent slopes, severely eroded
LhD2	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, moderately eroded
LhD3	Lewisberry sandy loam, shallow, 15 to 25 percent slopes, severely eroded
LhE3	Lewisberry sandy loam, shallow, 25 to 45 percent slopes, moderately and severely eroded
LnA	Lindside silt loam, 0 to 3 percent slopes
LoB2	Linganore channery silt loam, 3 to 8 percent slopes, moderately eroded
LoC2	Linganore channery silt loam, 8 to 15 percent slopes, moderately eroded
LoD2	Linganore channery silt loam, 15 to 25 percent slopes, moderately eroded
LrB3	Linganore channery silty clay loam, 3 to 8 percent slopes, severely eroded
LrC3	Linganore channery silty clay loam, 8 to 15 percent slopes, severely eroded
LrD3	Linganore channery silty clay loam, 15 to 25 percent slopes, severely eroded
LrE3	Linganore channery silty clay loam, 25 to 45 percent slopes, moderately and severely eroded
Ma	Made land
McB2	Manor channery silt loam, 3 to 8 percent slopes, moderately eroded
McB3	Manor channery silt loam, 3 to 8 percent slopes, severely eroded
McC2	Manor channery silt loam, 8 to 15 percent slopes, moderately eroded
McC3	Manor channery silt loam, 8 to 15 percent slopes, severely eroded
McD2	Manor channery silt loam, 15 to 25 percent slopes, moderately eroded
McD3	Manor channery silt loam, 15 to 25 percent slopes, severely eroded
McE2	Manor channery silt loam, 25 to 45 percent slopes, moderately eroded
McE3	Manor channery silt loam, 25 to 45 percent slopes, severely eroded
MdB2	Manor silt loam, 3 to 8 percent slopes, moderately eroded
MdB3	Manor silt loam, 3 to 8 percent slopes, severely eroded
MdC2	Manor silt loam, 8 to 15 percent slopes, moderately eroded
MdC3	Manor silt loam, 8 to 15 percent slopes, severely eroded
MdD2	Manor silt loam, 15 to 25 percent slopes, moderately eroded
MdD3	Manor silt loam, 15 to 25 percent slopes, severely eroded
MdE2	Manor silt loam, 25 to 45 percent slopes, moderately eroded
MeC4	Manor soils, 8 to 15 percent slopes, very severely eroded
MeD4	Manor soils, 15 to 25 percent slopes, very severely eroded
MeE3	Manor soils, 25 to 45 percent slopes, severely eroded
MeF	Manor soils, 45 to 65 percent slopes
MgA	Melvin silt loam, 0 to 3 percent slopes
Mh	Mixed alluvial land
MmB2	Montalto silt loam, 3 to 8 percent slopes, moderately eroded
MmC2	Montalto silt loam, 8 to 15 percent slopes, moderately eroded
MnD2	Montalto silty clay loam, 15 to 25 percent slopes, moderately and severely eroded
MoC2	Montalto very stony silt loam, 3 to 15 percent slopes, moderately eroded
MoE2	Montalto very stony silt loam, 15 to 45 percent slopes, moderately eroded
NeB2	Neshaminy silt loam, 3 to 8 percent slopes, moderately eroded
NeC2	Neshaminy silt loam, 8 to 15 percent slopes, moderately eroded
NsB3	Neshaminy silty clay loam, 3 to 8 percent slopes, severely eroded
NsC3	Neshaminy silty clay loam, 8 to 15 percent slopes, severely eroded
NsD3	Neshaminy silty clay loam, 15 to 25 percent slopes, severely eroded
PeA2	Penn silt loam, 0 to 3 percent slopes, moderately eroded
PeB2	Penn silt loam, 3 to 8 percent slopes, moderately eroded
PeB3	Penn silt loam, 3 to 8 percent slopes, severely eroded
PeC2	Penn silt loam, 8 to 15 percent slopes, moderately eroded
PeC3	Penn silt loam, 8 to 15 percent slopes, severely eroded
PeC4	Penn silt loam, 8 to 15 percent slopes, very severely eroded
PeD2	Penn silt loam, 15 to 25 percent slopes, moderately eroded
PeD3	Penn silt loam, 15 to 25 percent slopes, severely eroded
PeE2	Penn silt loam, 25 to 45 percent slopes, moderately eroded
PsF	Penn soils, 45 to 65 percent slopes
PvC2	Penn very stony silt loam, 3 to 15 percent slopes, moderately eroded
PvE2	Penn very stony silt loam, 15 to 45 percent slopes, moderately eroded
ReA	Readington silt loam, 0 to 3 percent slopes
ReA2	Readington silt loam, 0 to 3 percent slopes, moderately eroded
ReB2	Readington silt loam, 3 to 8 percent slopes, moderately eroded
RkA	Roanoke silt loam, 0 to 8 percent slopes
Rn	Rock land
RoA	Rowland silt loam, 0 to 8 percent slopes
RsB2	Rumford loamy sand, 3 to 8 percent slopes, moderately eroded
SaB2	Sassafras loam, 3 to 8 percent slopes, moderately eroded
SaC2	Sassafras loam, 8 to 15 percent slopes, moderately eroded
SfB2	Sassafras loam, clayey substratum, 3 to 8 percent slopes, moderately eroded
SsB2	Sassafras sandy loam, 3 to 8 percent slopes, moderately eroded
SsC2	Sassafras sandy loam, 8 to 15 percent slopes, moderately eroded
SsE2	Sassafras sandy loam, 15 to 30 percent slopes, moderately eroded
StC	Stony land, Manor materials, 3 to 15 percent slopes
StE	Stony land, Manor materials, 15 to 45 percent slopes
UbA	Urbana silt loam, 0 to 3 percent slopes
UbB2	Urbana silt loam, 3 to 8 percent slopes, moderately eroded
UbC2	Urbana silt loam, 8 to 15 percent slopes, moderately eroded
UbC3	Urbana silt loam, 8 to 15 percent slopes, severely eroded
WcB	Watchung silt loam, 0 to 8 percent slopes
WhA	Wehadkee silt loam, 0 to 3 percent slopes
WkA	Wickham silt loam, 0 to 3 percent slopes
WkB2	Wickham silt loam, 3 to 8 percent slopes, moderately eroded
WkC2	Wickham silt loam, 8 to 15 percent slopes, moderately eroded
WoA	Worsham silt loam, 0 to 8 percent slopes

Soil map constructed 1960 by Cartographic Division, Soil Conservation Service, USDA, from 1957 aerial photographs. Controlled mosaic based on Maryland plane coordinate system, state zone, Lambert conformal conic projection, 1927 North American datum.

0 1 Mile

Scale 1:15840

0 5000 Feet

10

N

(Joins sheet 5) | (Joins sheet 6)

(Joins sheet 9)

(Joins sheet 11)

(Joins sheet 15)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 11

(Joins sheet 6) | (Joins sheet 7)

11

(Joins sheet 10)

(Joins sheet 12)

N

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 16)

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12

(Joins sheet 7)

N

(Joins sheet 11)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

(Joins inset, sheet 18)

(Joins sheet 17) | (Joins sheet 18)

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 13

(Joins sheet 8)

13

N

(Joins inset, sheet 19)

(Joins sheet 14)

(Joins sheet 20)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

Soil maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report
ed from aerial photographs

(Joins sheet 9)

(Joins sheet 13)

(Joins sheet 15)

(Joins sheet 21)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 15

(Joins sheet 10)

15

N

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 22)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

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16

(Joins sheet 11)

N

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 23)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 12)

(Joins sheet 16)

(Joins sheet 18)

(Joins sheet 24)

N

(Joins sheet 17)

(Joins sheet 25)

(Joins sheet 12)

(Joins above left)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins above right)

(Joins sheet 13)

(Joins below left)

(Joins sheet 20)

(Joins sheet 26)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

N

19

(Joins sheet 1)

(Joins sheet 3)

(Joins sheet 5) | (Joins sheet 6)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

20

(Joins sheet 13)

N

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 27)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 21

(Joins sheet 14)

21

N

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 28)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

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(Joins sheet 15)

N

(Joins sheet 21)

(Joins sheet 23)

(Joins sheet 29)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 23

(Joins sheet 16)

N

(Joins sheet 22)

(Joins sheet 24)

(Joins sheet 30)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

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(Joins sheet 17)

24

N

(Joins sheet 23)

(Joins sheet 25)

(Joins sheet 31)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 18)

(Joins sheet 24)

(Joins sheet 32)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

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(Joins sheet 19)

(Joins sheet 27)

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 27

(Joins sheet 20)

N

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 34)

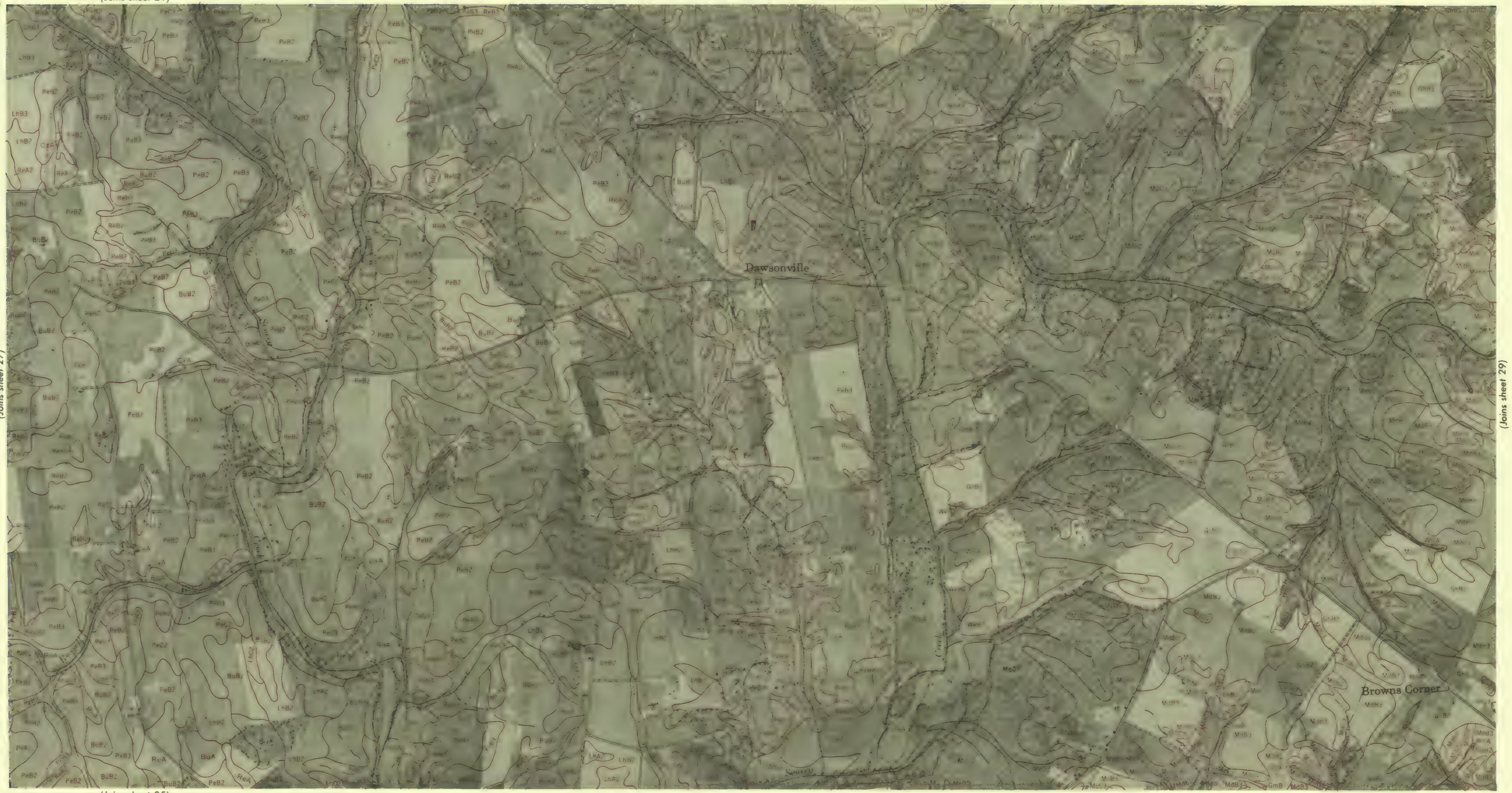
0 ½ 1 Mile Scale 1:15840 0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1957.

28

(Joins sheet 21)

N



(Joins sheet 27)

(Joins sheet 29)

(Joins sheet 35)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 29

(Joins sheet 22)

29

N

(Joins sheet 28)

(Joins sheet 30)

(Joins sheet 36)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

compiled from aerial photographs

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 3

3

(Joins sheet 1)

(Joins sheet 2)

write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map

(Joins sheet 6) | (Joins sheet 7)

0 ½ 1 Mile

Scale 1:15 840

0 5000 Feet

(Joins sheet 23)

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 30

N

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 37)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 24)

(Joins sheet 30)

(Joins sheet 32)

(Joins sheet 38)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1957.

(Joins sheet 25)

N

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 39)

Scale 1:15 840

0 ½ 1 Mile

0 5000 Feet

N

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 27)

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 34

N

(Joins sheet 35)

(Joins inset, sheet 41)

(Joins sheet 28)

(Joins sheet 34)

(Joins sheet 36)

(Joins inset, sheet 41) | (Joins sheet 41)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 29)

36

N

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 41) | (Joins sheet 42)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 31)

38

N

(Joins sheet 37)

(Joins sheet 39)

(Joins sheet 43) | (Joins sheet 44)

Scale 1:15840

0 5000 Feet

(Joins sheet 32)

(Joins sheet 38)

(Joins sheet 40)

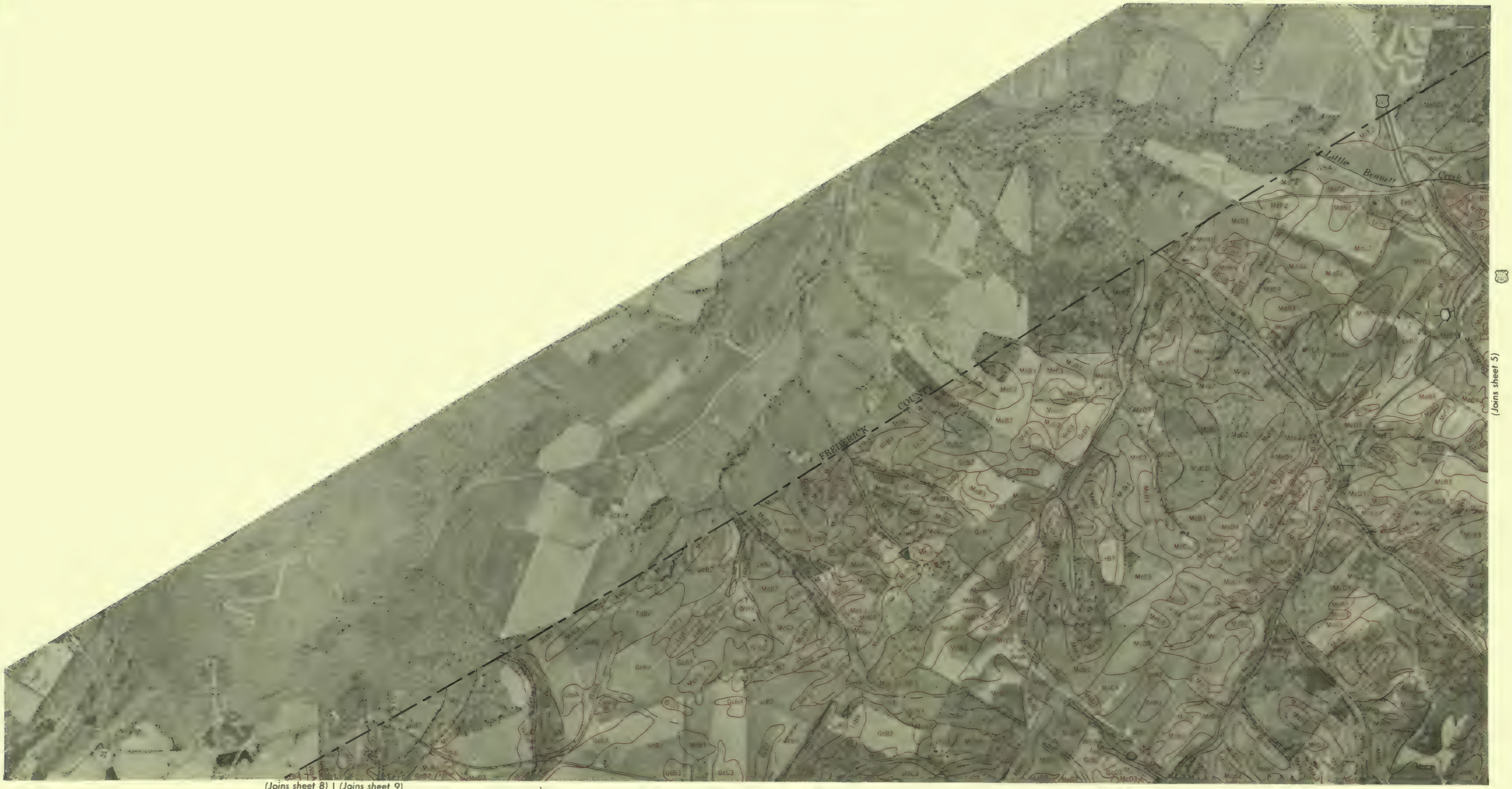
(Joins sheet 44) | (Joins sheet 45)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

N


4
N
Little Bennett Creek
FREDERICK COUNTY
(Joins sheet 5)
(Joins sheet 8) | (Joins sheet 9)
0 ½ 1 Mile
Scale 1:15840
0 5000 Feet

40

(Joins sheet 33)

N

(Joins sheet 39)

(Joins sheet 45)

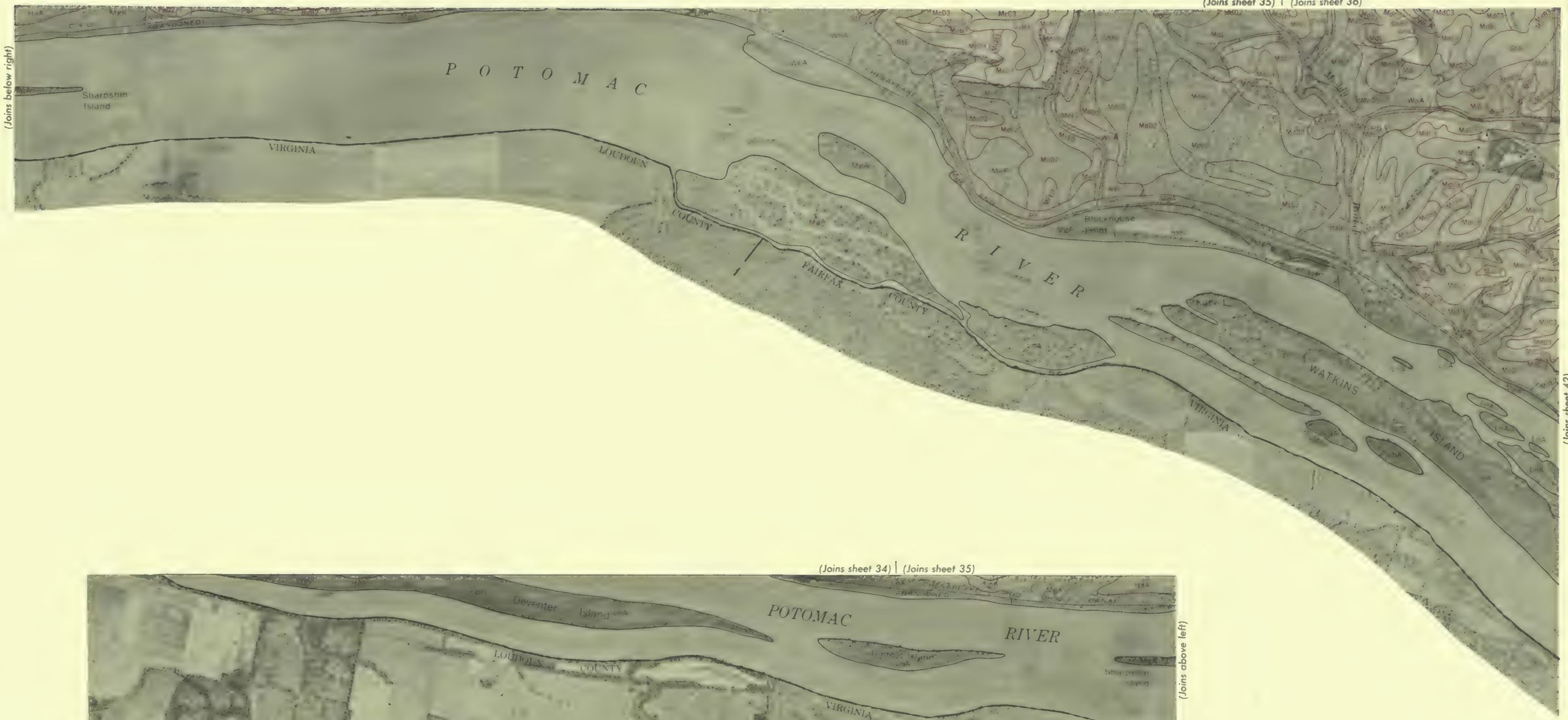
0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 35) | (Joins sheet 36)

(Joins below right)



(Joins sheet 34) | (Joins sheet 35)

(Joins above left)

(Joins sheet 42)

N

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

(42)

(Joins sheet 36) | (Joins sheet 37)

N

(Joins sheet 41)

(Joins sheet 43)

(Joins sheet 46)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 43

(Joins sheet 37) | (Joins sheet 38)

(Joins sheet 42)

(Joins sheet 44)

(Joins sheet 47)

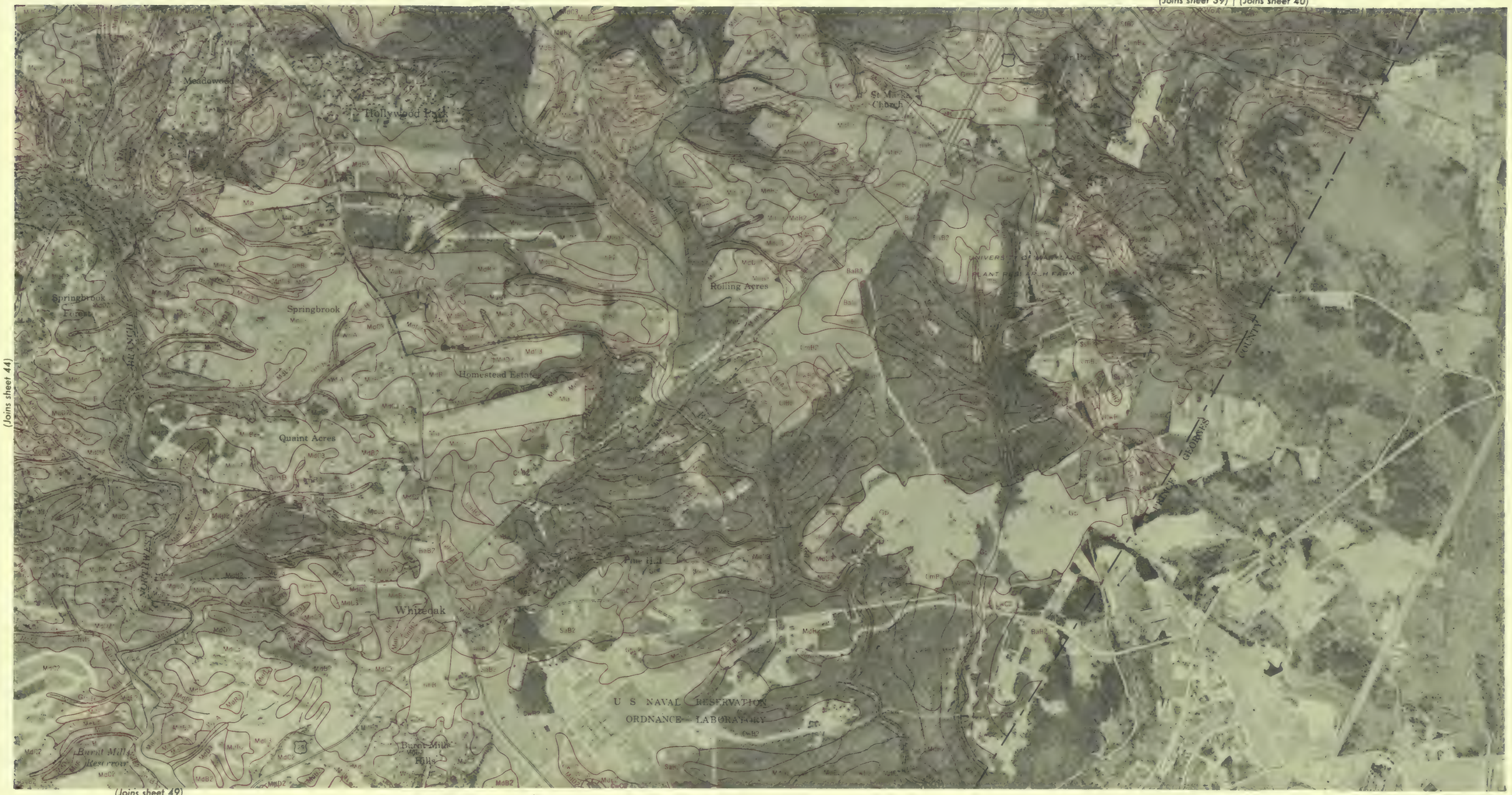
(Joins sheet 38) | (Joins sheet 39)

(Joins sheet 43)

(Joins sheet 45)

(Joins sheet 48)

(Joins sheet 39) | (Joins sheet 40)



(Joins sheet 44)

(Joins sheet 49)

(46)

(Joins sheet 42)

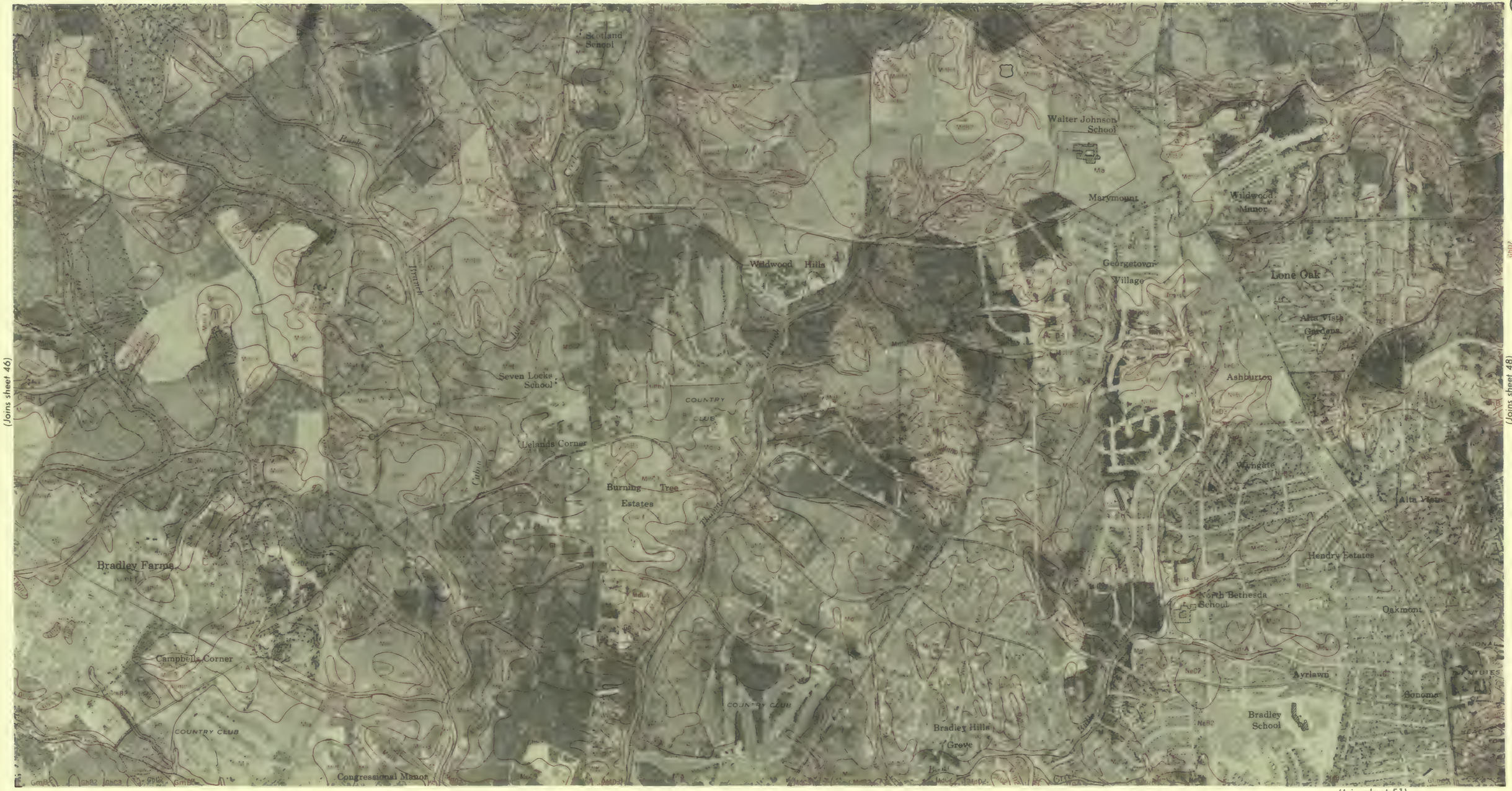
N

(Joins sheet 47)

(Joins sheet 50)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

(Joins sheet 43)



(Joins sheet 46)

(Joins sheet 48)

(Joins sheet 51)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 44)

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 52)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 45)

(Joins sheet 48)

(Joins sheet 53)

N

½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 5

(Joins sheet 2)

5

N

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 9) | (Joins sheet 10)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

This is one of a set of maps surveyed by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1954.

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 50

50

N

(Joins sheet 46)

(Joins sheet 51)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

(Joins sheet 47)

51

N

(Joins sheet 50)

(Joins sheet 52)

0 1/2 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 54)

(Joins sheet 48)

52

N

(Joins sheet 51)

(Joins sheet 53)

(Joins sheet 54)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 49)

(Joins sheet 52)

N

0 1/2 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 54

(54)

(Joins sheet 51) | (Joins sheet 52)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

6 (Joins sheet 2) | (Joins sheet 3)

(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 10) | (Joins sheet 11)

0 ½ 1 Mile Scale 1:15840 0 5000 Feet

N

(Joins sheet 6)

(Joins sheet 11) | (Joins sheet 12)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

(Joins sheet 4)

(Joins sheet 9)

(Joins sheet 13)

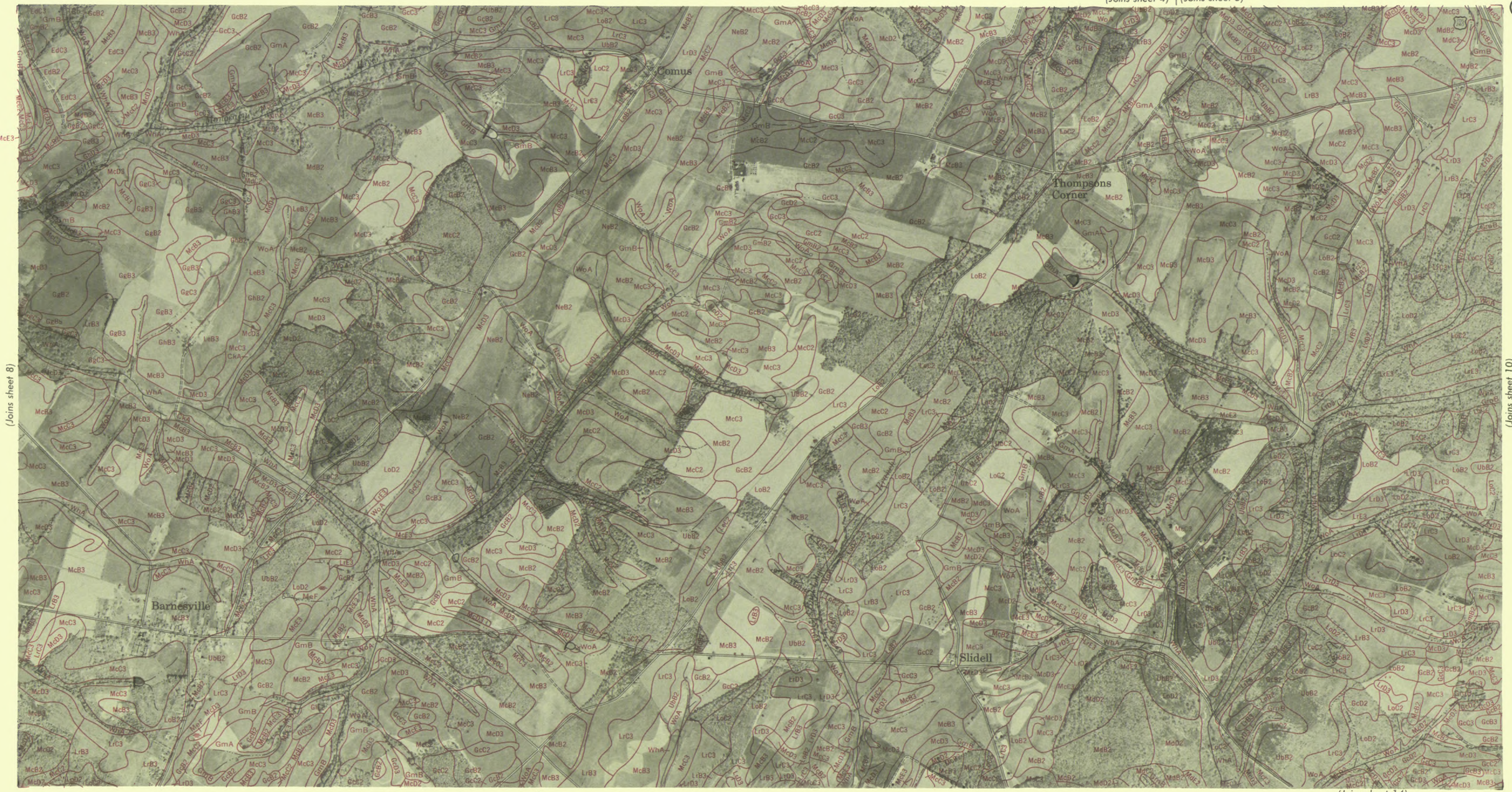
0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND-SHEET NUMBER 9

(Joins sheet 4) | (Joins sheet 5)



(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 14)

0 ½ 1 Mile

Scale 1:15840

0 5000 Feet

MONTGOMERY COUNTY, MARYLAND
CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads

- Dual
- Poor motor
- Marker, U. S. (33)

Railroads

- Single track
- Multiple track
- Abandoned

Bridges and crossings

- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings

- School
- Church
- Station

Mine and Quarry

Dump

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

BOUNDARIES

- National or state
- County
- Township, U. S.
- Section line, corner
- Reservation
- Land grant

DRAINAGE

Streams

- Perennial
- Intermittent, unclass.

Canals and ditches (CANAL / DITCH)

Lakes and ponds

- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments

- Bedrock
- Other

Prominent peaks

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil type outline and symbol (Dx)
- Gravel
- Stones
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gullies